

User Manual DMS

DieselManagementSystem

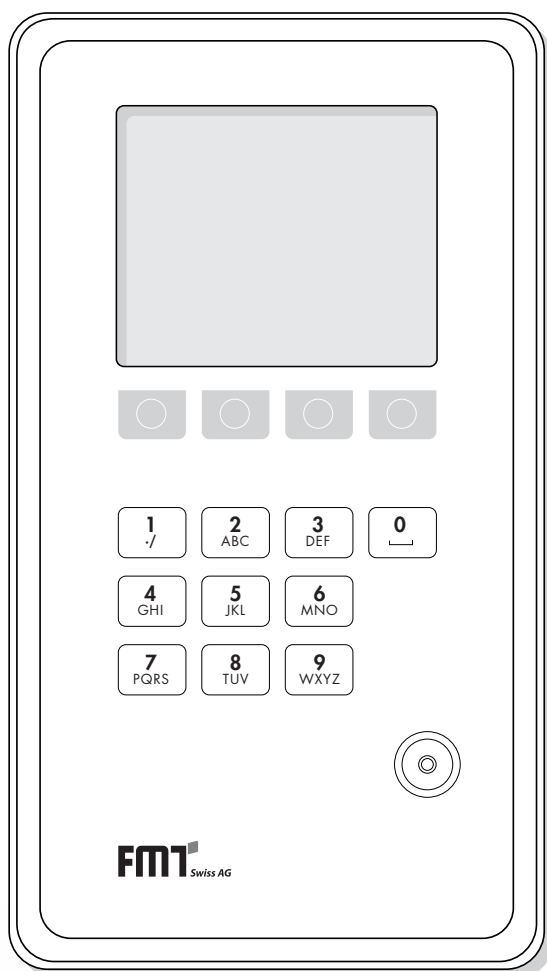


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1. Document history

Date	Name	Version	Change
03/11/2008	NS	1.00	Initial draft
22/01/2009	NS	1.10	Adapted to DieselFixx Version 1.1
01/12/2009	NS	1.30	DieselFixx => DMS Version 1.4: Configuration and Data view extended. DMS on Mac Note acc. to usage of second tank
11/12/2009	NS	1.31	reset to factory settings
01/02/2010	NS	1.32	User editing restrictions
16/03/2010	HD	1.33	small revision
20.07.2010	HD	1.40	description of the reporting-function
08.10.2010	TS	1.40	XML Import/Export

2. Synopsis

This document describes the installation, use and modification options of the PC application of DMS. This application is used to configure the hardware, manage users, vehicles and stations, and view the data collected by the hardware.

Throughout this document we will refer to the jar file and all other files used and managed on the PC as the **“DMS PC application”**. To all parts of the station hardware, including the iButton, the control unit, the firmware and anything else, we will refer to as the **“DMS hardware”**.

This document consists of three major parts:

- The first part in chapter 3 describes the installation of the DMS PC application.
- The second part in chapter 3.6 describes the usage of the DMS PC application; especially what each display is used for and which options each type of user can use or not.
- The third part in chapter 5 describes how to modify the files used by DMS, if needed.

The DMS PC application is designed to run under Windows and Linux as well. There are some differences at these operating systems, the application has to care about. This will be discussed in separate sub-sections, one for Linux and one for Windows, wherever this affects the user.

Please note:

Names or commands in code style like this shall have to be typed-in exactly as they are written in this document.

3. How to install DMS

The DMS is already configured with the Java Runtime Environment for Windows and Linux. Use these files if you cannot get actual JRE's by updating your system over the internet. The following files can be found on the installation CD.

- jre-6u7-windows-i586-p-s.exe contains Java for Windows
- jre-6u7-linux-i586.bin contains Java for Linux

The DMS installation files are also available separated for Windows and Linux:

- DMSW32Setup.msi contains DMS installation for Windows
- DMS.tar.gz contains DMS installation for Linux

3.1 Windows

First install the actual Java runtime environment. We deliver the JRE 6 with DMS. To install this, just execute jre-6u7-windows-i586-p-s.exe.

The next step is to execute DMSW32Setup.msi which will install the DMS files. This copies the file DMS.jar and the folder DMSdata in the directory you have chosen during the installation process. It also creates a shortcut in the Windows "Startmenu".

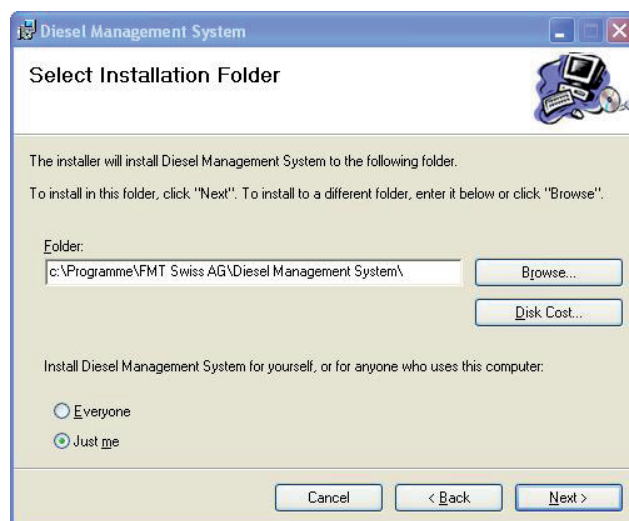
If you want to use the **iButton**-Reader (since DMS version 1.3) you must install the drivers and setup the reader.

Run the install file (e.g. install_1_wire_drivers_x86_v402.msi) provided with the reader and follow the instructions. After successful installation go to Start → Programs → 1-Wire Drivers x86 → Default 1-Wire Net.exe. Click on the button "Auto-Detect" in the lower left corner (the reader must be connected to the PC) and confirm the found interface. You now can use the reader in DMS (see section 4.5).

3.1.1. Windows Vista and Windows 7

The DMS software cannot be installed in the standard register C:\programme or C:\programme files of Windows Vista and Windows 7-systems.

During the installation the following dialog will be displayed:



Open instead of "C:\programme" another user-defined file, i.e. "C:\FMT\Diesel Management System".

3.2 Linux

Please update your Linux system and install the sun-java6-jre or a similar one if available. If not, install Java by executing the jre-6u7-linux-i586.bin from the DMS installation.

The DMS PC application will possibly not run correctly with other Java Runtime Environment then the Sun JRE.

Copy the file DMS.tar.gz to the home directory of the user that shall use the DMS PC application. To unpack the tar archive type in `tar -xzf DMS.tar.gz` on the Linux shell. This will place the DMS.jar file in the home directory and creates the folder DMSdata in which all files used by DMS are stored..

3.3 Uninstall DMS

To uninstall DMS go to Windows Control panel and open the "Software" assistant. Then select DMS and click "Remove". This will remove the DMS PC application files. The XML files with the data will remain on the disk.

To uninstall DMS under Linux delete the DMS.jar and the DMSdata folder. All files will be lost then..

3.4 Update DMS

To update DMS under Linux do unpack the new DMS.tar.gz file similar to section 3.2.

To update DMS under Windows first uninstall DMS similar to section 3.3 and then install DMS using the new *.msi file similar to section 3.1.

3.5 Backup data files

All data used by DMS PC application is stored in the DMSdata folder. You should at least backup all *.xml files in this folder. If you restore files from backup copy all files back to the DMSdata folder.

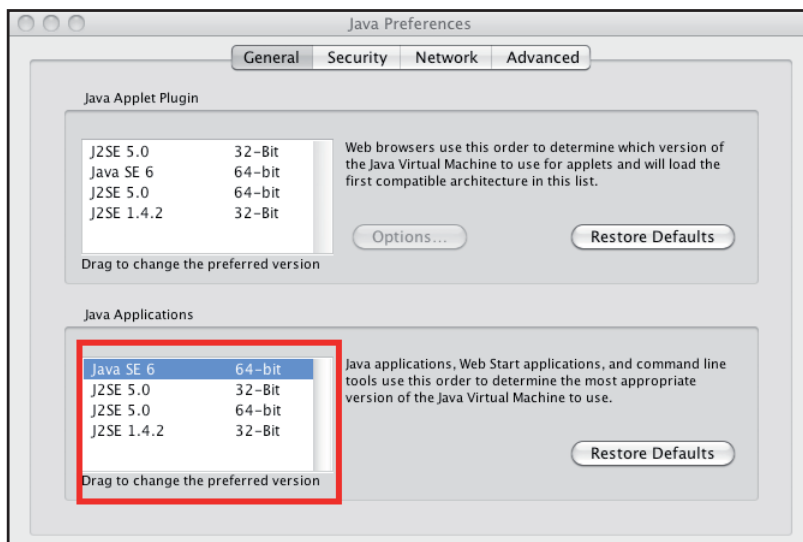
3.6 DMS on Mac

To use DMS on Mac you need JavaSE 6 (32-bit or 64-bit). These must in the first row of the "Java Preferences" -> "Java Applications" (see screenshot).

To install DMS, please copy the file DMS.tar.gz in a folder with write-access and unzip the archive there. This will create the file DMS.jar and the DMSdata folder.

You can start DMS by typing `java -jar DMS.jar` on the console when in the installation folder.

Usage of the **iButton-Reader** is not possible on the Mac.



4. How to use DMS

4.1 Starting DMS

To start the DMS PC application run the DMS.jar. In the following we describe how this is done on the according operating system.

4.1.1. Windows

If the Java Runtime Environment JRE 6 is installed properly you can start the DMS.jar by double clicking on it.

If this does not work you can type `%jre%\bin\javaw -jar %dms% \DMS.jar` on the windows command prompt. Where `%jre%` is the path to your JRE installation and `%dms%` the path to your DMS installation. For example:

```
C:\Programme\Java\jre1.6.0\bin\javaw -jar C:\DMS\DMS.jar
```

The installation program of DMS will give you a batch file named DMS.bat, so you don't have to open a command prompt and type in all the paths every time. Just double click on the batch file.

4.1.2. Linux

On modern Linux distributions you have a default program to open each type of file. So when you have installed the sun-java6-jre you can start the DMS.jar by just right click on it and choose "Open with Sun Java 6 Runtime".

If this is not possible, you can just type in `java -jar DMS.jar` in the Linux shell.

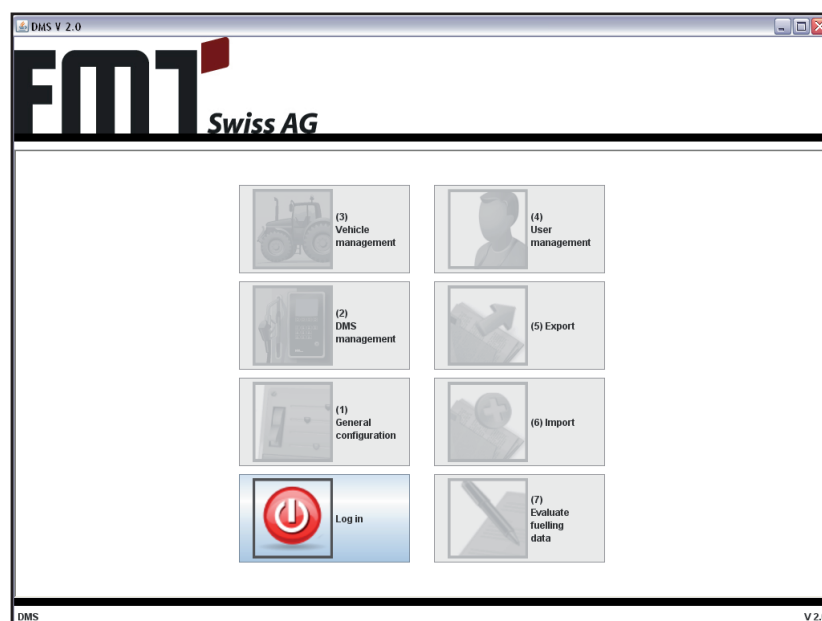
4.2 Using Tables

All tables in the DMS PC application can be handled in the same way. If you want to delete, change or adjust an user, vehicle, station or something else, first select the according line, then click the change or delete button.

Each table can be sorted by clicking on the header of the column you want to sort by. Click again to sort inverse. Columns can also be resized by dragging the border of the column header.

4.3 Main menu

After starting the application you will see the main menu screen below. The most buttons are disabled for security reason. Before you can do anything you have to log in and verify yourself. (See section 4.4 "Log in / out")



After you are logged-in successfully you will see the main menu as shown below. Depending on your user type some buttons may still be disabled. (See section 4.5 "General configuration")



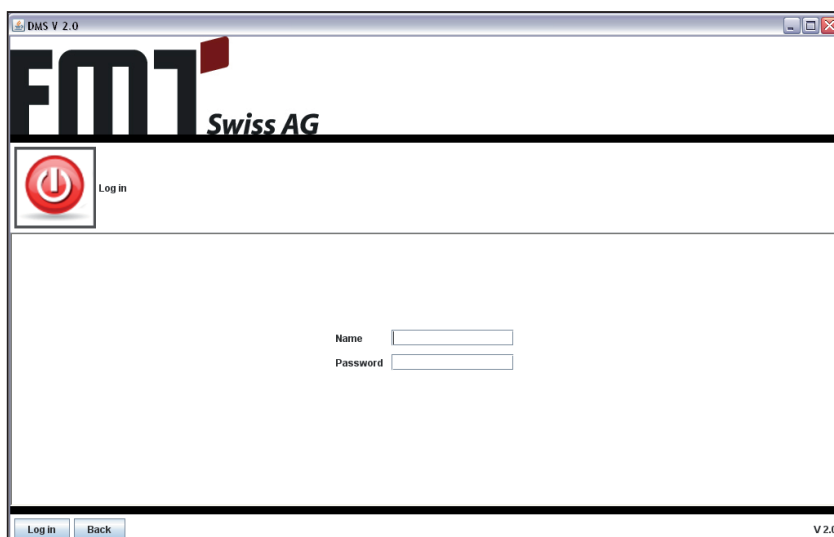
4.4 Log in / out

On the "Log in" screen you can type your DMS user name and your DMS password. If the name or password are incorrect or do not match, you will get a message. If your name and password are correct you will automatically be led to the main menu. The buttons on main menu are active now, according to your user rights.

The "Log in" button now has changed to a "Log out" button. Pressing this button will log you out and deactivate all buttons except the "Log in" button.

Please pay attention to the following:

There is only one standard user with the name "Admin" and with the pass-word "Admin" available when starting the DMS-PC application for the first time. Please change the pass-word immediately and save the new pass-word carefully. This user will unchangeable remain in the system forever. It cannot be deleted. Utilizing the user "Admin" und the (new) pass-word you are permitted to log-in with supervisor authorisation at any time.



4.5 General configuration

The configuration display is only available for service engineers users, other users can view this screen, but cannot change anything.

Please note the following hints:

- In the language list all available languages for DMS are shown. Available means, there have to exist two language files for a language to be listed: *_pc.txt and *_fw.txt (for example engl_pc.txt and engl_fw.txt for English). Possible languages are English, French, German, Italian, Russian and Spanish. This selection does affect the language of the DMS PC application and the DMS hardware as well. (For file formats please refer to chapter 5 "How to modify DMS language files")
- The character set setting gives you the choice between "Latin1" and "Cyrillic". Set this to Cyrillic if you have text files with Cyrillic letters, like Russian texts, for the DMS hardware. The DMS PC application will display Cyrillic texts automatically correctly.
- If you choose "Yes" for "User shall give odometer reading", then the user is forced to give the reading of his vehicles' odometer before he can make a draw on a DMS.
- If you choose "Yes" for "User shall give operating hours", then the user is forced to give the reading of his vehicles' odometer before he can make a draw on a DMS.
- The maximum hand over on the DMS can be set from 0 (no maximum) up to 999 litres.
- The checkboxes in the sensors area activates the according sensor on the hardware. For the first tank you can fix a min. and max. value for the temperature and pressure sensor. These min. values are matched to the lower bound of the sensors metering range, the max. value to upper bound. The threshold gives the value, at which an alert will occur.
- The user identification on the DMS is possible by PIN, iButton or both of them.
- The vehicle selection can be made by typing in the car license number or selecting the vehicle from a list given on the display.
- The "Max PIN failure" is the amount of trials the user can make before the log-in blocks for a specific time. This time is set by the "Input lock after trials" field. The maximum is 10 trials and 30 minutes of blocking time.
- The delay between the last draw and the hardware going to standby can be set up to 1000 seconds.
- The display backlight will shut-off after the given time, which can be up to 30 minutes.
- The pump will start with a delay of up to 180 seconds after the nozzle is removed from the holder.
- The flow control time can be up to 120 seconds.
- The "Heater on"-temperature must be at least 3°Celsius below the "Heater off"-temperature.
- A user can be identified with an I-button by default. This correlation can be switched to the vehicle by selection of „I-button vehicle correlation“.
The user can identify himself by PIN only, if the I-button correlation has been switched from the user to the vehicle. Chooses a user in the step "Identification" the attribute „I-button" the registration will be effected for the vehicle only, not for the user.

DMS V 2.0

FMT Swiss AG

(1) General configuration

Language: English

Charset: Latin1

User shall give meter reading: Yes

User shall give operating hours: Yes

Max. handover: 2 Litre

Sensors

	Min	Max	Threshold	Tank/Station 2
Tank/Station 1				
Pressure	1	2	1	Pressure threshold
Filling level				Tank empty
Embedded leakage sensor				
Leak				Leak
Tank temperature	1	2	1	

Assign iButton to vehicle? ☒

Identification: PIN

Vehicle selection: Input

Backlight: 1 Minutes

Max PIN failure: 1

Pump delay: 1 Seconds

Input lock after trials: 1 Minutes

Flowcontrol time: 1 Seconds

Standby delay after refuel: 1 Seconds

Heater on at: 10 Celsius

Heater off at: 13

OK Cancel Factory settings

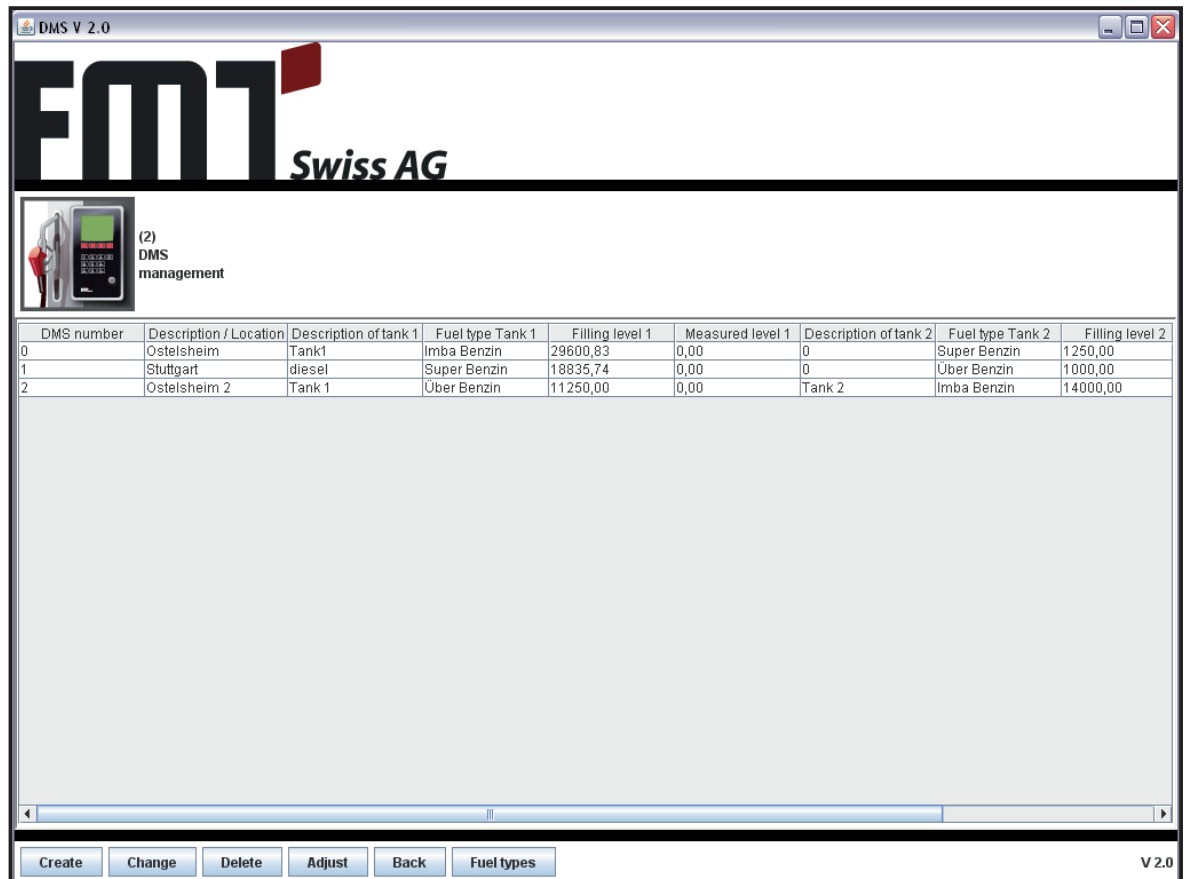
V 2.0

Using the button "Factory settings" you can reset all settings to factory settings in case factory settings have been delivered. These files are "config.xml" and "language.xml" in the subfolder "DMSDefaultData". If these files are not existing you cannot reset the settings.

4.6 DMS Management

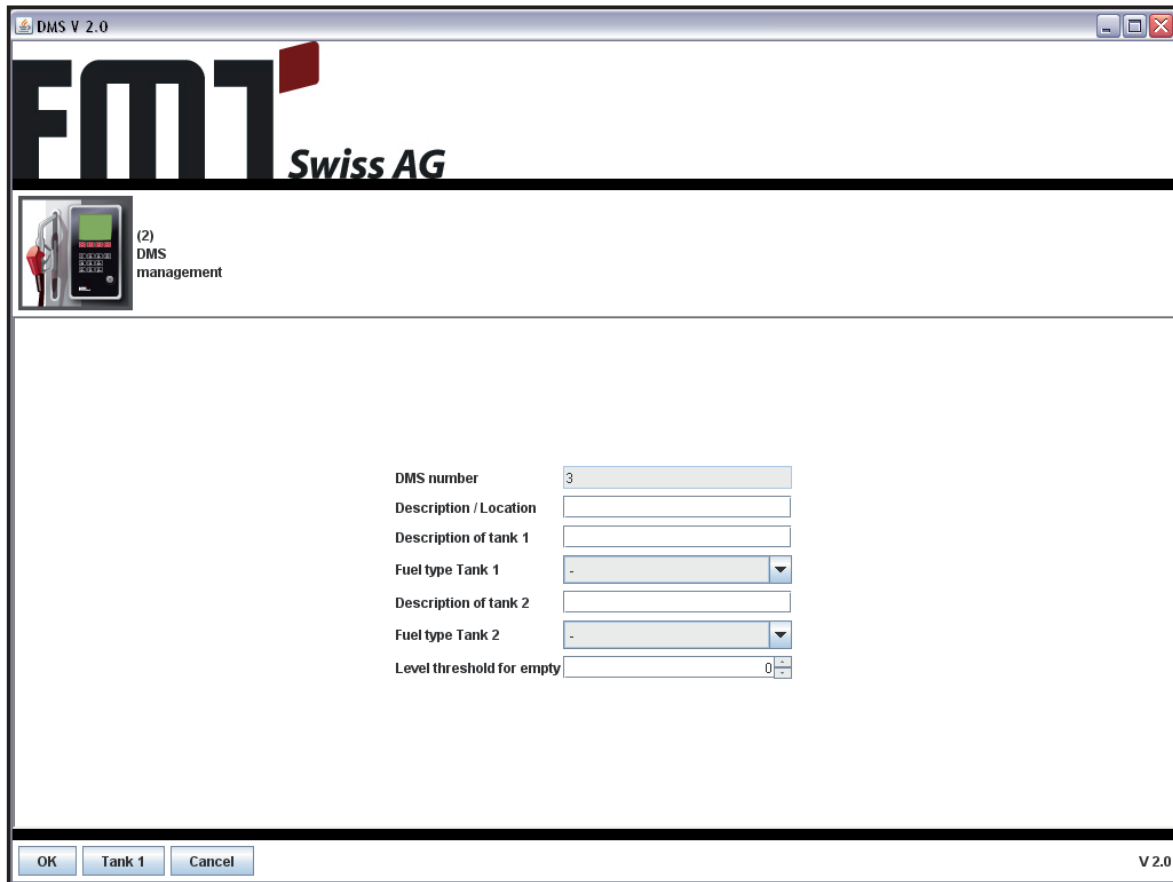
On the DMS management display you can create, change and delete stations and adjust the tank filling level.

The columns "Filling level 1" and "Filling level 2" show the calculated level of the first and second tank. This value will change upon each adjustment, or when importing data for that station. The columns "Measured level 1" and "Measured level 2" show the level like it is measured by the DMS hardware. This is shown for information purposes.



DMS number	Description / Location	Description of tank 1	Fuel type Tank 1	Filling level 1	Measured level 1	Description of tank 2	Fuel type Tank 2	Filling level 2
0	Ostelsheim	Tank1	Imba Benzin	29600,83	0,00	0	Super Benzin	1250,00
1	Stuttgart	diesel	Super Benzin	18835,74	0,00	0	Über Benzin	1000,00
2	Ostelsheim 2	Tank 1	Über Benzin	11250,00	0,00	Tank 2	Imba Benzin	14000,00

On the “change” display you can provide a description or a location for each station and also describe each tank separately. The threshold value is used by the DMS hardware to decide when to issue a “tank empty” alert. It can be set from 0 up to 999999 litres.



The screenshot shows the 'DMS V 2.0' window with the 'FMT Swiss AG' logo at the top. Below the logo is a small icon of a fuel nozzle and the text '(2) DMS management'. The main area contains a form with the following fields:

- DMS number:
- Description / Location:
- Description of tank 1:
- Fuel type Tank 1: (dropdown menu)
- Description of tank 2:
- Fuel type Tank 2: (dropdown menu)
- Level threshold for empty: (with minus and plus buttons)

At the bottom of the window are three buttons: 'OK', 'Tank 1', and 'Cancel'. The version 'V 2.0' is displayed in the bottom right corner.

Using a second tank with this station

If you like to use a second tank with this DMS - with a second sort of diesel - you can enter its name here. This name is also displayed on the terminal when the filling procedure starts. The fuelling user decides whether he uses the first or second diesel type/tank by lifting the correspondent diesel control nozzle.

Clicking on the "Tank 1" button in the change display will pop-up the tank display as shown below. You can edit the level - volume relation of the tank.

The height should start from 0 in the first line down to the internal height of the tank in centimetres. This describes the distance between the sensor at the inner top of the tank and the surface of the fuel.

The right column defines the tank filling level in litres according to the measured distance.

Clicking the insert button below the table, a new row is inserted above the selected row, or at the end, if no row is selected.

Clicking the delete button below the table, the selected row is deleted.

Height	Litre
0	0

Insert Delete

OK Cancel V 2.0

Clicking the adjust button on “DMS Management” display the “station adjust” display is shown. Here you can adjust on the filling level of each DMS stations’ tanks.

Please note the following hints:

- The time and date are automatically set to current time and date, but you can change both to the time, the event is taking place.
- The user name cannot be changed, the currently logged-in user is shown.
- The amount of the adjustment is given in litres with two decimal places.
- The station number is set by the selection you have made on the “Station management” display. It is not changeable here.
- Please do not forget to choose the correct tank.
- The type of the adjustment is one of the following: charge, post or adjust. Draw is not possible here. Draws will be reported using the import from the SD card.

A “charge” in this context means, you have discharged some fuel from a tank, the discharged volume will be automatically subtracted from the current level. A “post” means a refilling of the tank, the given amount will be added to the current level. An “adjust” means you just want to correct the level of the tank. In DMS you cannot set the level directly so you have to insert a positive or negative volume that will be added to the current level.

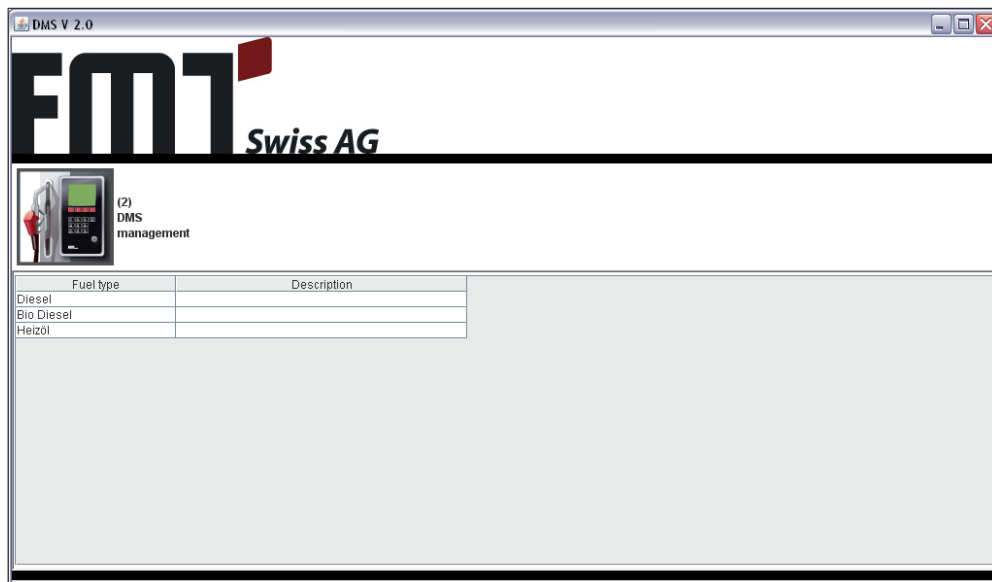
Date	26.07.2010
Time	15:30:11
Name	Admin
Amount	0
DMS number	0
Tank	1
Type	Charge
Comment	

For a more comfortable reporting you will be able to correlate each bulk tank to a pre-defined fuel type. You can choose between "Fuel type tank 1" and "Fuel type tank,".

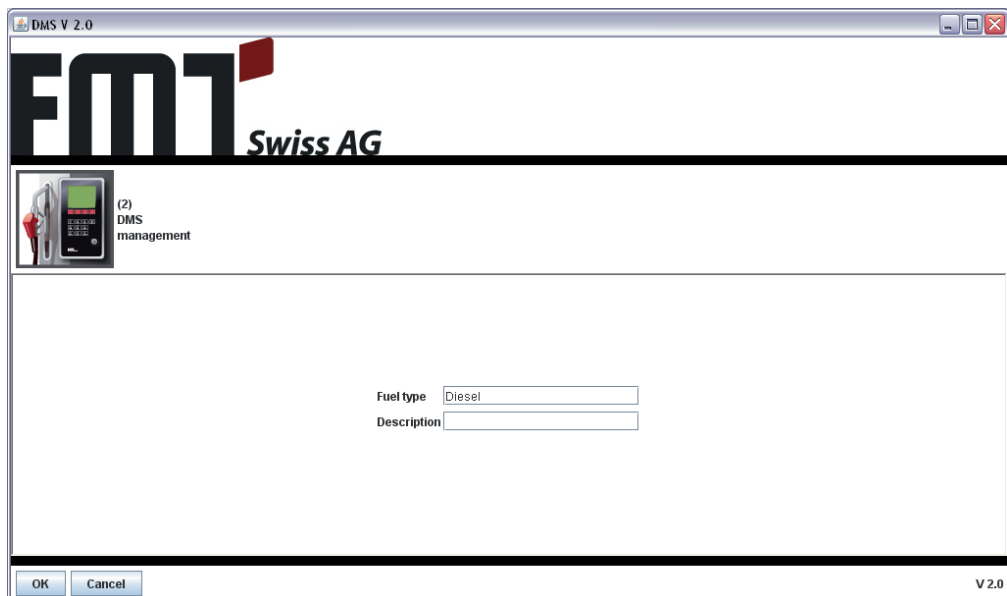
Please see chapter 4.6.1 how to import fuel types.

4.6.1. Fuel types

You are able to import various descriptions of different fuels to the DMS and to correlate them to a tank connected to a DMS terminal. The chart shown offers a summary of any fuel type imported in connection to the description given by you.



When clicking on „Change“ or „New“ you will enter the input dialog



Entering „Back“ you will leave the section import of fuel types and come back to the DMS administration.
For entering the pricing section click on „fuel prices“.

Fuel prices

Fuel type: Diesel

Price valid	valid from	valid til
-------------	------------	-----------

New price:

valid from: 27.07.2010 ?

valid til: 27.07.2010 ?

Confirm entry

OK

In this section you are able to correlate each type of fuel, to be chosen under „Fuel type“, to prices per litre valid for different time periods.

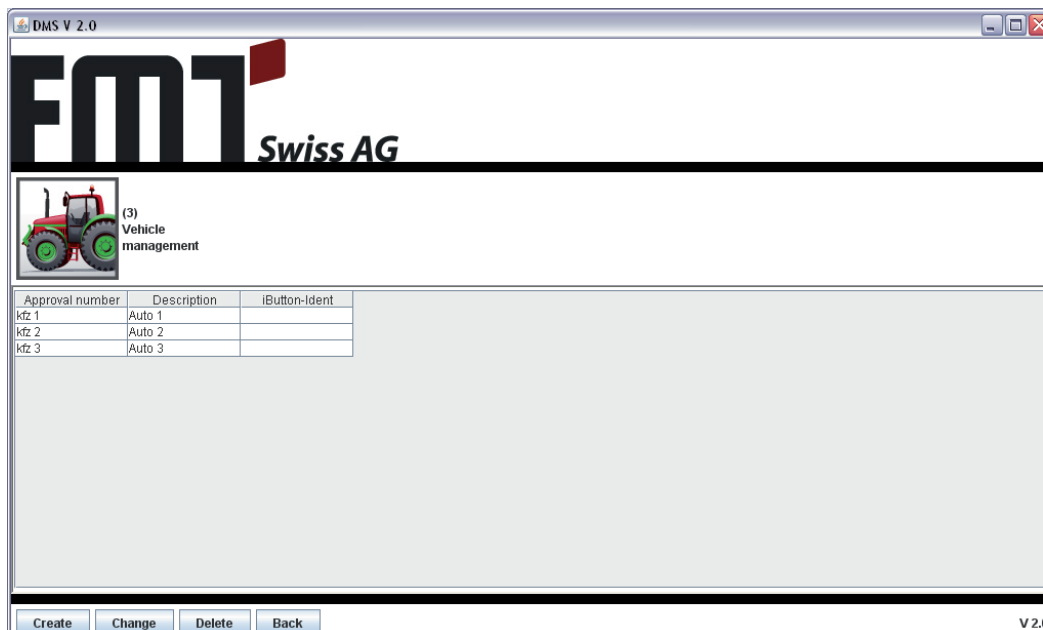
Proceed as follows:

- Choose the fuel type requested
- Import under „New price“ the price per litre valid from now on.
- Select the period for the validity of the new price.
- Confirm with „Enter“

The price will get immediate validity. Differing prices valid for the period chosen will be replaced. Already existing prices can be updated with this method as well by importing of a price for the same period again.,

4.7 Vehicle Management

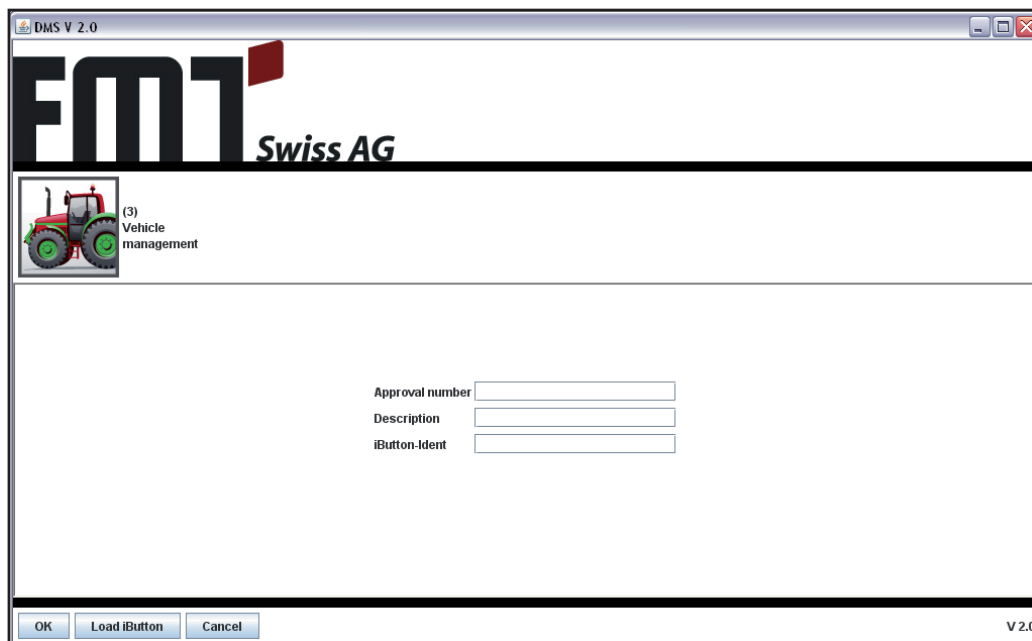
The "Vehicle management" display provides an overview of all vehicles managed by DMS.



Supervisor or service engineers users can create, change or delete vehicles. If you create a new vehicle you have to type in the car license number. This number can not be changed later! If you delete a vehicle, all user assignments of this vehicle to any users will be deleted automatically.

In case you did configure your system in the section „General Configuration“ relating the I-button to the vehicle and not to the user, so you will be able to realise this relation as follows:

Having connected and configured an I-button reader to your computer (see DMS manual section DMS Installation) you will be able to import the I-button ident from this I-button directly and to correlate this I-button ident to a vehicle.

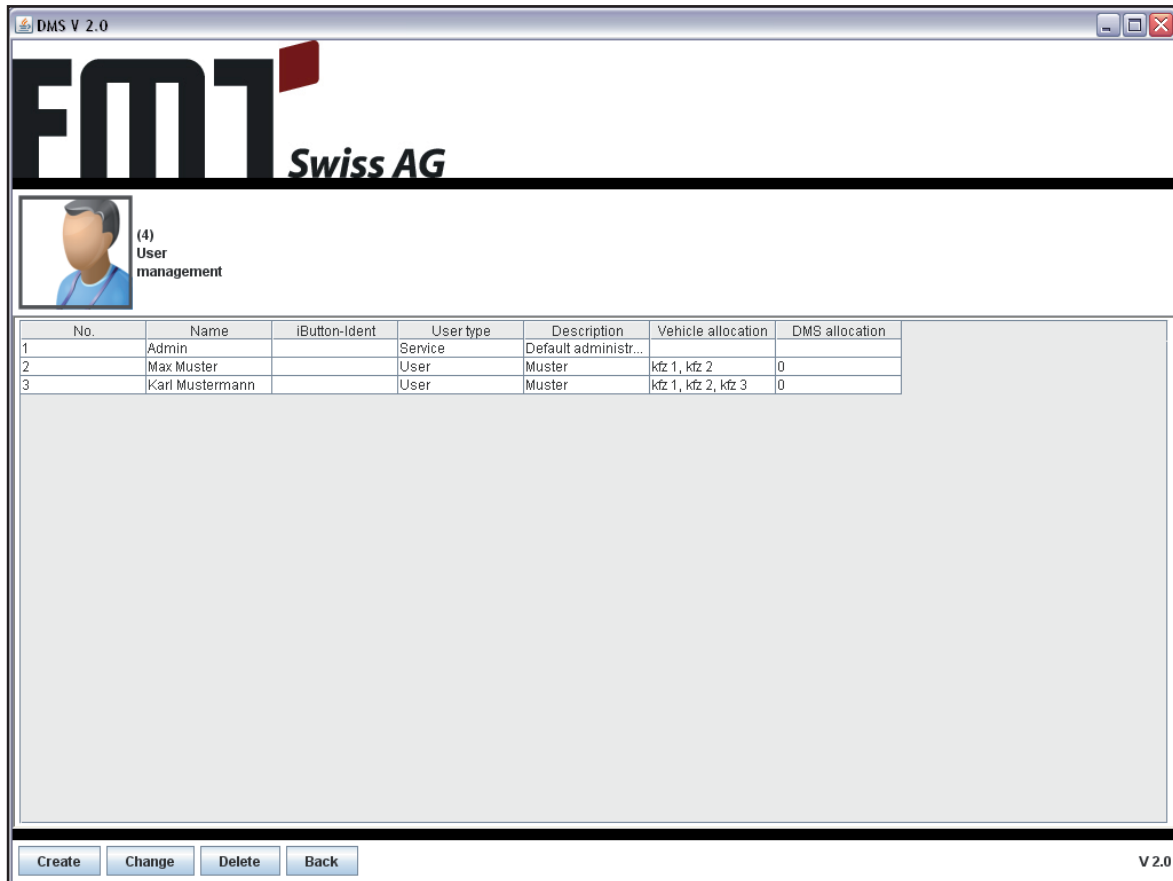


4.8 User management

The “User management” screen gives you an overview of all users and their properties. You can create new users, change existing ones or delete them.

User can be imported from SD-Card, see section 4.10 for details.

Different user types have different permissions and restrictions. They are discussed in detail in the subsections below.



On the “change” display (which is the same as the create user display) you can edit the properties of each user.

Please note the following hints:

- The number can not be changed, it is managed internally.
- If no pass-word has been stored the relevant and adjusted user will get no access to the DMS software. This is valid for the user-level “user” only.
- The PIN can be empty, otherwise it has to contain exactly four numerical digits.
- If at least one station is allocated, the PIN can not remain empty.
- The user “Admin” can not change his name and can not select refuelling stations.
- The iButton-Ident can be empty; otherwise it has to contain exactly 16 hexadecimal digits (letters can be set in upper case or lower case). This number must match the code of the iButton the user is utilising.
- The user type “Service” can only be set by service engineers users.
- To select or deselect stations and vehicles, just hold the CTRL key, while clicking the stations or vehicles you want to assign to the user.

If you have the iButton-Reader connected to your PC and configured (see section 3), you can read-in the iButton-Ident directly from the iButton and assign to a user. Click on the button “Load iButton” and follow the instructions.

FMT Swiss AG

(4) User management

No.	2	DMS allocation	0 - Ostelsheim
Name	Max Muster		1 - Stuttgart
Password			2 - Ostelsheim 2
PIN			
iButton-Ident		Vehicle allocation	kfz 1
User type	User		kfz 2
Description	Muster		kfz 3

OK Load iButton Cancel V 2.0

4.8.1. Standard user

The standard user is not able to change anything in the DMS PC application. He is allowed to view the data and configuration settings and to view users, stations and vehicles.

He is also allowed to make draws on the stations assigned to him with the vehicles assigned to him. The need for a PIN or iButton for this operation is subject to prior set up in the configuration display (see section 4.8 "General configuration").

4.8.2. Supervisor

The supervisor user is allowed to do everything the standard user is allowed to do.

- Additionally he is permitted to do the following additional actions:
- Import of the data from the stations (via SD card).
- Export of the the configurations and user setup to the stations (via SD card).
- Create, change and delete vehicles.
- Create, change and delete standard and supervisor users.
- Change service users, but not their user type.
- Create, change and delete stations and adjust their tank levels.

4.8.3. Service user

The service user rights have no limitation. He can do everything a supervisor can do and more:

- Create, change and delete service users.
- Change the general configuration.

4.9 Export

The calibration, the data file, the front files, the user list and the tank description can be exported to the DMS terminal on the display for data exporting.

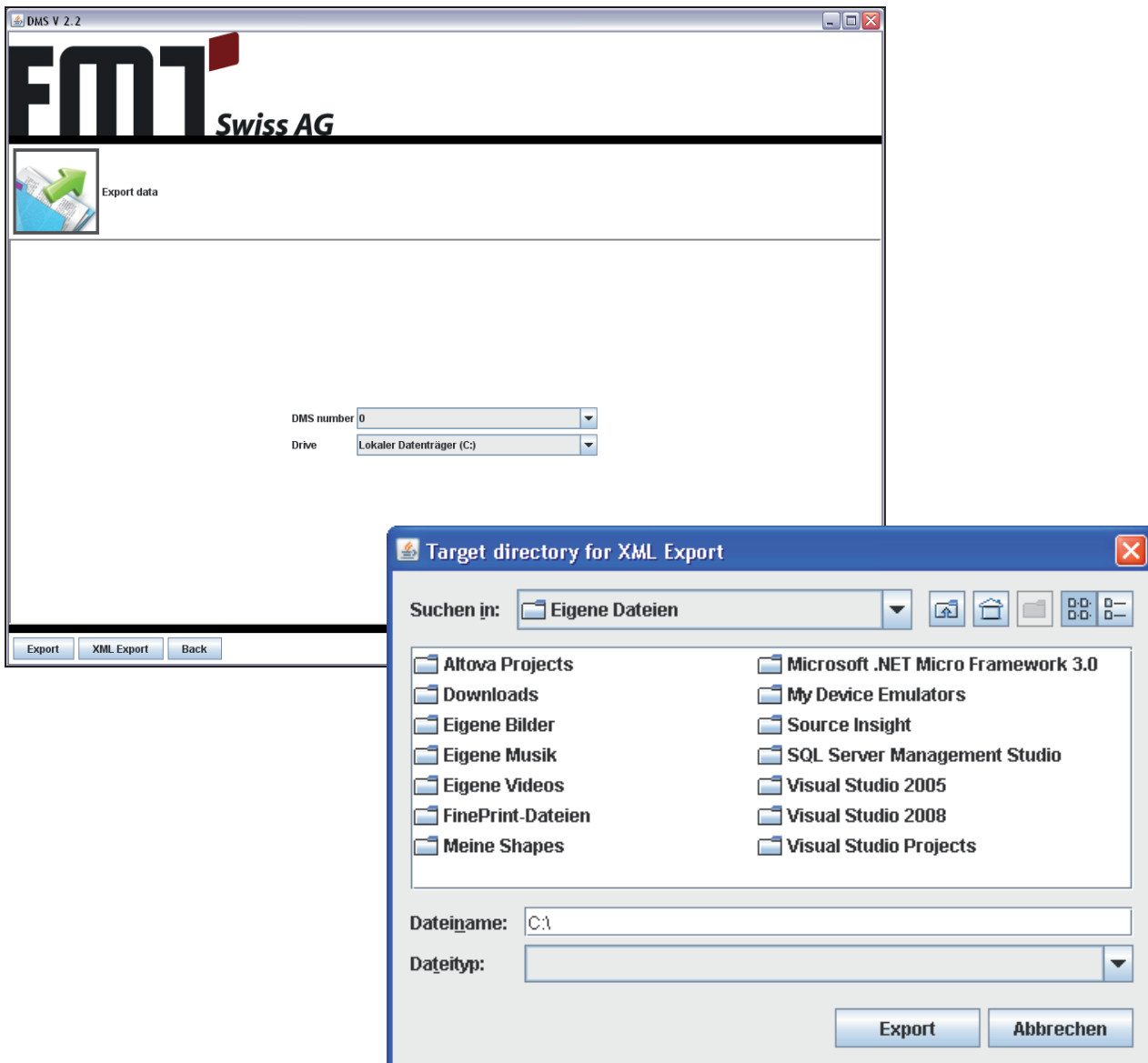
Select a DMS station to export to in the first list, then select the drive or mount point of the SD card to write the data to, then click the export button.

In case of a re-use of a SD card you will be asked prior to a new utilization if all old data can be deleted if the SD card has been used for another DMS system before.

The drive list will contain all available drives if running under Windows, or all available mount points from the /media and /mnt directories if running under Linux. If your SD card is not listed here, just make sure it is mounted correctly by accessing them using the Windows explorer or your standard Linux explorer. Under Linux you can try remounting it to either /media or /mnt.

If a file like the text file or font file is missing the export will stop and inform you.

With the button "XML Export" all files used by the Diesel Management System will be copied to a selected folder.



4.10 Import

On the import display you can import the fuelling data from the DMS hardware via the SD card. Just select the drive or mount point from the list and click import.

The drive list works exactly like the drive list on the export screen (section 4.9 "Export").

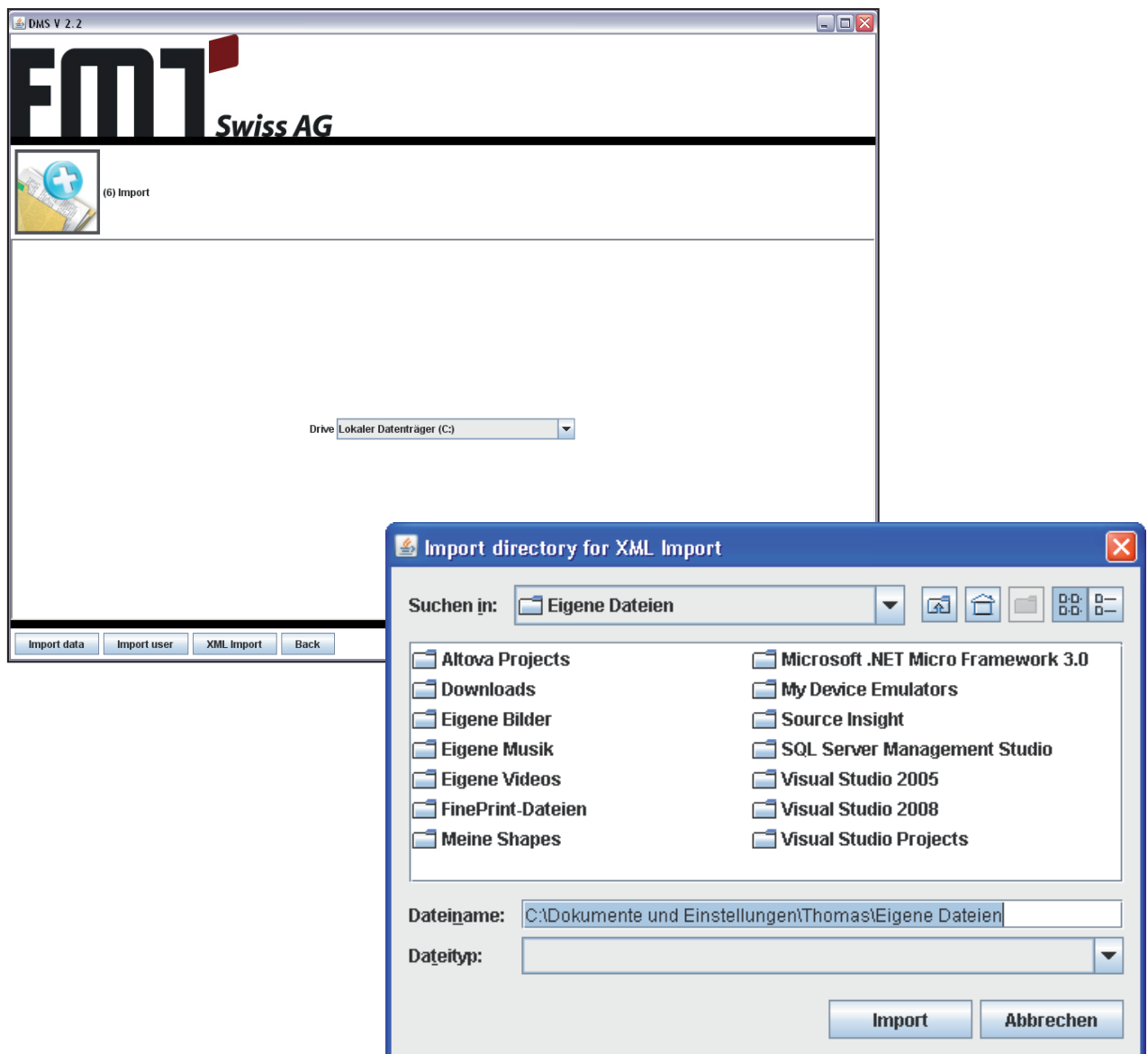
With the button "Import user" you can import users, that have been exported before. (When exporting a station, all users assigned to this station are exported, too).

If the PIN of an imported user is the same as the PIN of an existing user, you will be asked to override the existing user or to skip the import of this user. After the import you are informed of the total number of imported (new and overwritten) users.

During this import the station and all vehicles assigned to the users are imported too.

Descriptions and passwords can not be imported.

With the button "XML Import" all files used by the Diesel Management System will be copied from a selected folder to the working folder. Existing files may be overwritten.



4.11 View data

Any information about refilling processes can be displayed and edited in the dialog „Tank data analysis“. All data about re-filling processes or about manual adjustments have been stored in the DMS terminal.

4.11.1. Data filters

The period of displayed data can be limited. Enter a start and end-date for the period which will have to be analysed and press „Enter“ or select the period to be analysed in the calendar enclosed.

The screenshot shows the DMS V 2.2 software interface. At the top, there is a logo for FMT Swiss AG and a button labeled '(7) Evaluate fuelling data'. Below this, there is a date input field showing '27.07.2010' and a calendar for July 2010. The calendar has the 27th selected, and a message at the bottom says 'Heute ist der 27. Juli 2010'. Below the calendar, there is a table with the following columns: Date, Time, Name, Approval number, Litre, DMS number, Tank, Distance, Consumption l/100km, Operating hours, and Consum. The table contains three rows of data:

Date	Time	Name	Approval number	Litre	DMS number	Tank	Distance	Consumption l/100km	Operating hours	Consum
01.01.07	13:51:53	Bernhard Kai...	kfz 1	0,50	0	1	100	0,50	2	0,25
02.01.07	13:51:53	Bernhard Kai...	kfz 1	0,60	0	1	150	1,20	5	0,20
03.01.07	13:51:53	Bernhard Kai...	kfz 1	0,70	0	1	200	1,40	8	0,23

At the bottom of the interface, there are several buttons: Back, Reporting and Printing, CSV Export, Export settings, Fuel prices, and Delete data acc. to date. The version number 'V 2.2' is displayed in the bottom right corner.

Choose the requested data base in the keyword list for analysing the stored data based on user name, car registration, DMS terminal number or tank. The data-table presented will be sorted automatically. For reset the data filter choose the first element „-“.

All data filters will be effective for each printout and for any CSV-export as well.

4.11.2. Evaluation and printing

Proceed as follows to get a report display of the date choosen.

Print Preview

Settings of print view

Sort List by... ☐ Date ☐ User ☒ Approval number

Options: ☒ Show subtotals ☒ Show distance ☒ Show operating hours
☒ Show fuel type ☒ Show price

Date	Time	DMS number	Tank	Fuel type	Distance	Operating hours
Kfz 1						
01.01.2007	13:51:53	0	1	Imba Benzin	100	2
02.01.2007	13:51:53	0	1	Imba Benzin	150	5
03.01.2007	13:51:53	0	1	Imba Benzin	200	8
					450	15
Litre/Total		1,80				
Litre/100km		1,03				
Litre/Op.Hours		0,23				

Print **Cancel**

You can export any refilling data selectively for users, date (day) or for vehicles. A subtotal for each section can be edited clicking the button „Subtotal“

The report shows a section of the relevant mileages if in the selection base of the dialog „General configuration“ the criteria „User shall input mileage“ has been activated. You can choose wether the mileage shall be displayed or not.

The report shows a section of the relevant operating hours if in the selection base of the dialog „General configuration“ the criteria „User shall input operation hours“ has been activated. You can choose wether the operation hours shall be displayed or not.

When selecting the data for vehicles the report section „Mileage“ and „Operating hours“ are completed with totals and subtotals.

Showing the report sections „Price“ and Fueltype“ is optional and can be activated by marking the equivalent section with a little check mark on top of the section.

The total consumption (total of the section „Quantity“) the total consumption per 100 km (average of the consumed fuel of the section „consumption l/100km“) and the total consumption per hour (average of the consumed fuel of the section „consumption l/h“) will be displayed at the end of the list.

The button „Printer“ opens the printer dialog of your system enabeling you to choose and to configure the relevant printer and its configuration platform. This dialog will be displayed in your system-language and not in the preset DMS-language.

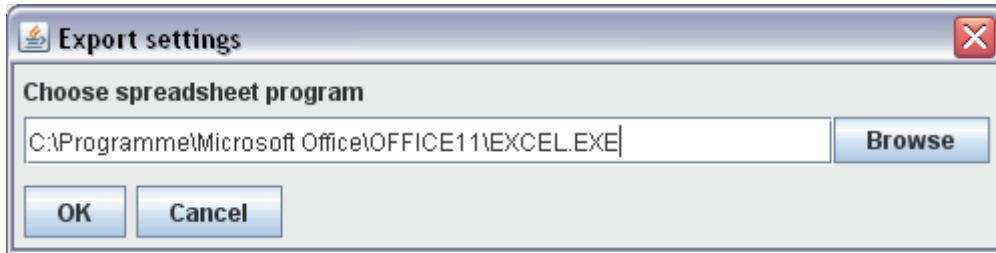
„Disconnect“ brings you back to the data display without printout.

4.11.3. CSV Export

The displayed table will be stored as CSV file (with semicolon as separator) when clicking the button „CSV-Export). A data-select-dialog appears for fixing of the storage place and the relevant name of the data file. The file extension „CSV“ will be added automatically.

This dialog will be displayed in your system language and not in the preset DMS language.

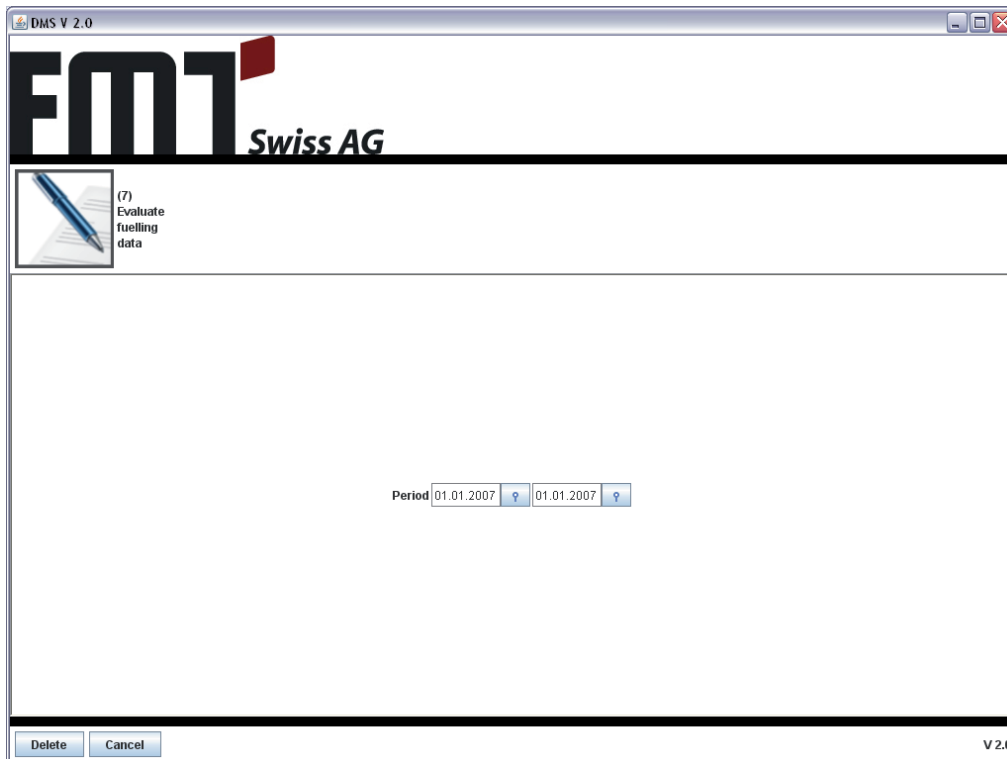
The total consumption (total of the section „Quantity“) the total consumption per 100 km (average of the consumed fuel of the section „consumption l/100km“) and the total consumption per hour (average of the consumed fuel of the section „consumption l/h) will be displayed at the end of the list.



We offer in the section „Export configuration“ a programme for data handling enabling you to reprocess the data after the CSV export. The software with the exported CSV file opens automatically if you have choosen a configuration i.e. „C:\Programme\OpenOffice.org 3\program\scal.exe“ guiding you to Microsoft Excel or Open Office automatically.

4.11.4. Deleting tank data by date

Pressing the button „Delete of tank data per date“ guides you to following dialog:



Importing a special period (date from ... to) deletes the tank data for the period pre-selected.

Attention: Any data will be irrevocable deleted after having pressed the relevant delete-button. DMS will ask you prior to final delete if the selected data shall be deleted truly. Confirming with „Yes“ deletes the data from the system irrevocably.

4.11.5. Price maintenance for fuel types

To get to the section price maintenance click on button „Fuelprices“.

The programme offers an identic dialog as specified in the section „DMS Administration“. There is no need to switch back to DMS Administration when adjusting the prices before printout.

Please see chapter 4.6.1.

5. How to modify DMS language files

The language files used by DMS hardware and PC application must match specific format constraints. In the following sections we describe how to create or manipulate the files.

5.1 Language files for PC application

The language files used by the DMS PC application are named with the language name in four letters and the postfix “_pc.txt” (for example `enlg_pc.txt`).

In the file each line starts with a three-digit-number, like “001”, followed by a colon, and the translated text.

For example:

```
008:Create
009>Delete
010:Log in
011:Log out
```

Important:

If changing a file do not change the line numbers! If you did so the text line is possibly not loaded into the PC application and the default text is used instead. Default texts are German.

If saving the language file, make sure it is saved in the UTF-8 encoding. Most editors in Linux and Windows give you the encoding choice when using the “Save as” function.

Using the UTF-8 encoding makes it possible to type Cyrillic letters as well as Latin letters and special letters like German “ä”, “ö”, “ü” or French letters with accents. Using a different encoding will cause some texts to be displayed wrong.

5.2 Language files for station hardware

The language files used by the DMS hardware are named with the language name in four letters and the postfix “_fw.txt” (for example `engl_fw.txt`).

The file begins with some comment lines, starting with a semicolon. Do not change them!

All other lines consist of a line three-digit-number, a colon and the translated text. The translated text should not be longer than 20 letters. For example:

```
026:Setup
027:Date
028:Time
029:Calibration
```

Important:

If changing a file do not change the line numbers! If you did so the text line is possibly not loaded to the hardware and will be missing!

If saving a language file, containing text in Latin letters (not Cyrillic letters), make sure it is saved with the encoding ISO-8859-1 or CP1252 (also known as “Windows western”), which are both nearly the same.

If saving a language file containing text in Cyrillic letters, make sure it is saved with the encoding KOI8-R. Do not choose ISO-8859-5 or CP1251 (also known as “Windows cyrillic”), these are not supported by the DMS hardware.

Most editors in Linux and Windows give you the encoding choice when using the “Save as” function. If using “Standard”, “ANSI” or “Platform” it is system dependent which encoding is used. Please use a high level text editor like *OpenOffice.org Writer* or *Microsoft Word* to get access to all encoding settings.

6. Configuration steps

Log-in

Name Enter „Admin“
Password Enter „Admin“

Confirm with **OK**

Select **General configurations**

General configurations

Language	Select
Symbol set	Select
The user must enter the mileage	Select
The user must enter the operating hours	Select
Max. discharge volume	Max. 10
Pressure	Activate with intergral sensor only
Liquid level	Activate with intergral level indicator only
Integral leakage indicator	Activate with intergral leakage indicator only
Leakage	Activate with intergral leakage indicator only
Tank temperature	Activate with intergral temperature indicator only
Identification	Select
Select of vehicles	Select
Number of PIN failiures	Max. 10
Time-out after PIN failiures	Max. 30 minutes
Waiting time between re-filling and idle-mode	Max. 1000 sec.
Heating on at	Enter temperature
Back-ground illumination	Max. 30 min.
Pump intermediate time	Max. 180 sec.
Flow-control time	Max. 120 sec
Heating shut-off at	Enter temperature

Confirm with **OK**

DMS Administration



Continue at ② ►

② ► select **DMS Administration**

Select **Configuration**

DMS. no.	Will be pre-selected by the system
Description/location	Enter the location
Description of tank 1	Enter the type of liquid
Description of tank 2	If available only
Level indication for „empty“	Enter minimum level of liquid

Click on **Tank 1**
(If level indicator abvailable only)

Select **Enter**
(A line will be added. Enter height of liquid level and the equivalent litres.)

Confirm with **OK**

Select line **DMS (previously opened)**

Select **Revision**

Date	Will be pre-selected by the system
Time	Will be pre-selected by the system
Name	The person indicated will be announced.
Volume	Enter re-filled volume
DMS.no.	Will be pre-selected by the system
Tank	Select
Type	Select
Remarks	Enter (optional)

Confirm with **OK**

Continue at ③ ►

③ ► Select **Vehicle administration**

Vehicle administration



Select **Configuration**

Car registration number	Enter
Description	Enter

Confirm with **OK**

Select **Back**

Select **User administration**

User administration



Select **Configuration**

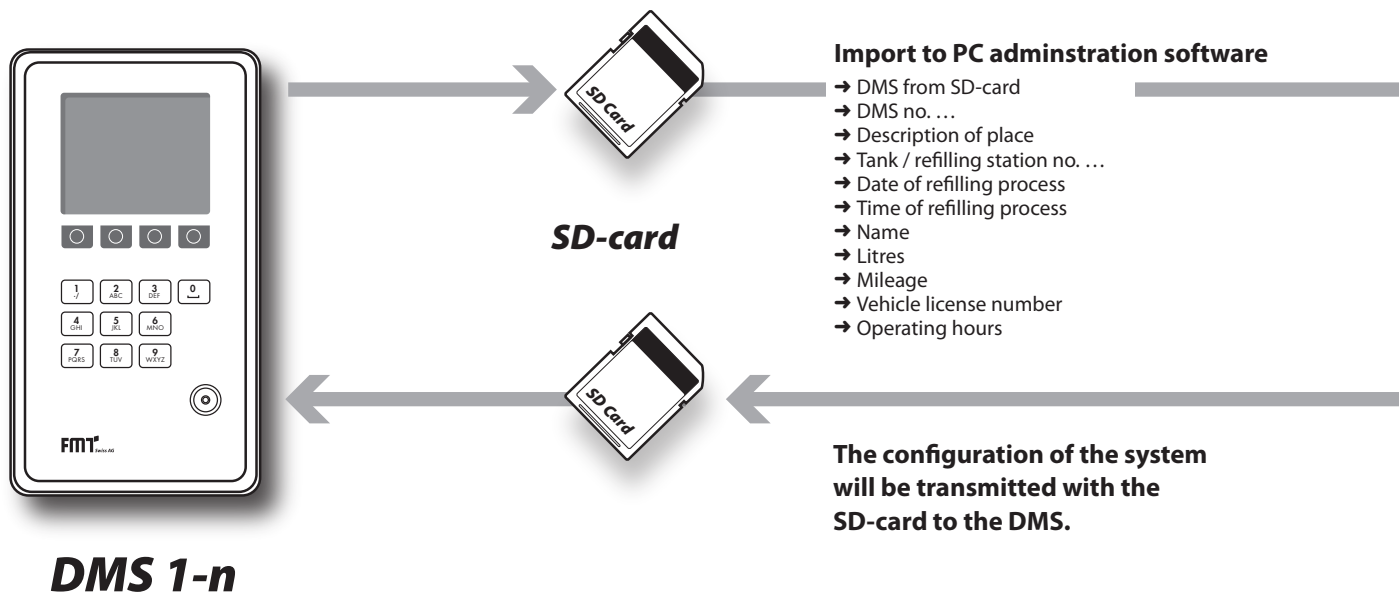
No.	Will be pre-selected by the system
Name	Enter
Password	Enter
PIN	Enter (4 digits)
I Button-Ident	Enter manually or use the I Button reader
Type of user	Select
Description	Enter (optional)
DMS-Correlation	Select
Vehicle correlation	Select

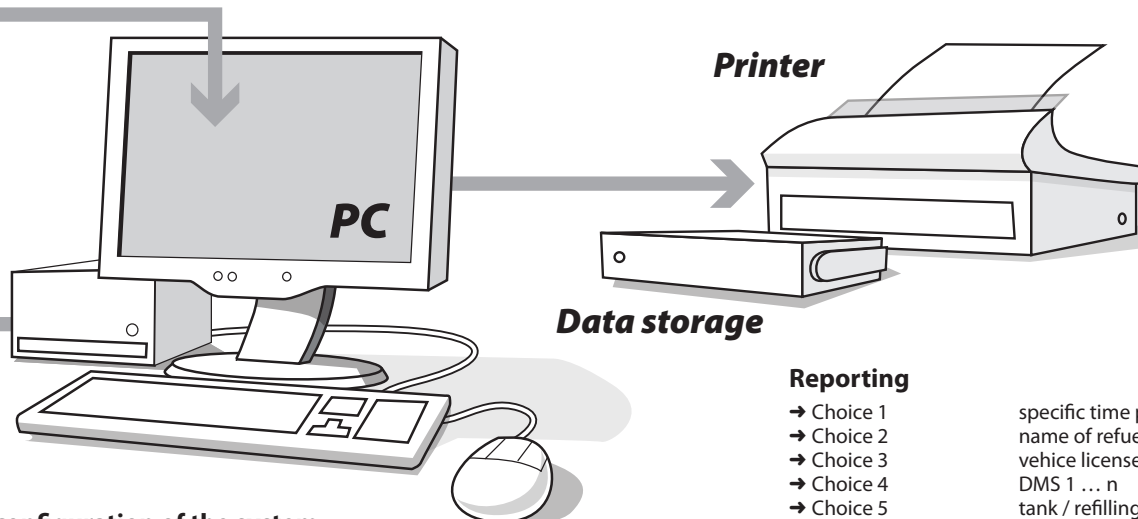
Confirm with **OK**

Select **Back**

Configuration is completed.

7. Data-flow DMS Dieselmanagementsystem





The configuration of the system will be generated on a PC and stored on the SD-card

- Names of users
- Configuration of i-button ident
- Assignment of the i-button ident to a user
- Correlation of the I-button to a vehicle
- Correlation of a fueltype to a price
- Number of permitted input failures (PIN)
- Time-out after permitted input failiures (min)
- Time between refuelling and non-operative time (sec)
- Configuration of user pass-words
- Type of user, user oriented
- Classification of vehicles, user oriented
- Decription of vehicles
- Classification of refilling station = tank, user oriented
- Decription of refilling station = tank
- Minimum refilling level for empty tank 1
- Volume calibration = tank 1
- Volume adjustments
- Language
- Charakter set
- Mileage input yes/no, user oriented
- Input of operating hours yes/no user oriented
- Max. refuelling voulme, all users
- Pressure = refilling station 1: yes/no
- Pressure = refilling station 1 = DMS 1: maximum pressure
- Pressure = refilling station 1 = DMS 1: minimum pressure
- Pressure = refilling station 1 = DMS 1: pressure threshold
- Liquid level tank 1: yes/no = DMS 1
- Integral leakage sensor: yes/no = DMS 1 = tank 1
- Leakage: yes/no = DMS 1 = tank 1
- Pressure = refilling station 2 = DMS 1: pressure threshold
- Tank empty = tank 2 = DMS 1
- Tank leakage = tank 2 = DMS 1
- Temperature of tank 1: yes/no = DMS 1
- Temperature of tank 1: min = DMS 1
- Temperature of tank 1: max = DMS 1
- Temperature of tank 1: threshold = DMS 1
- DMS heating switch-on at (°C)
- DMS heating switch-off at (°C)
- Background illumination (min)
- Time delay of pump operation (sec)
- Liquid-flow check time (sec)

Data storage

metered

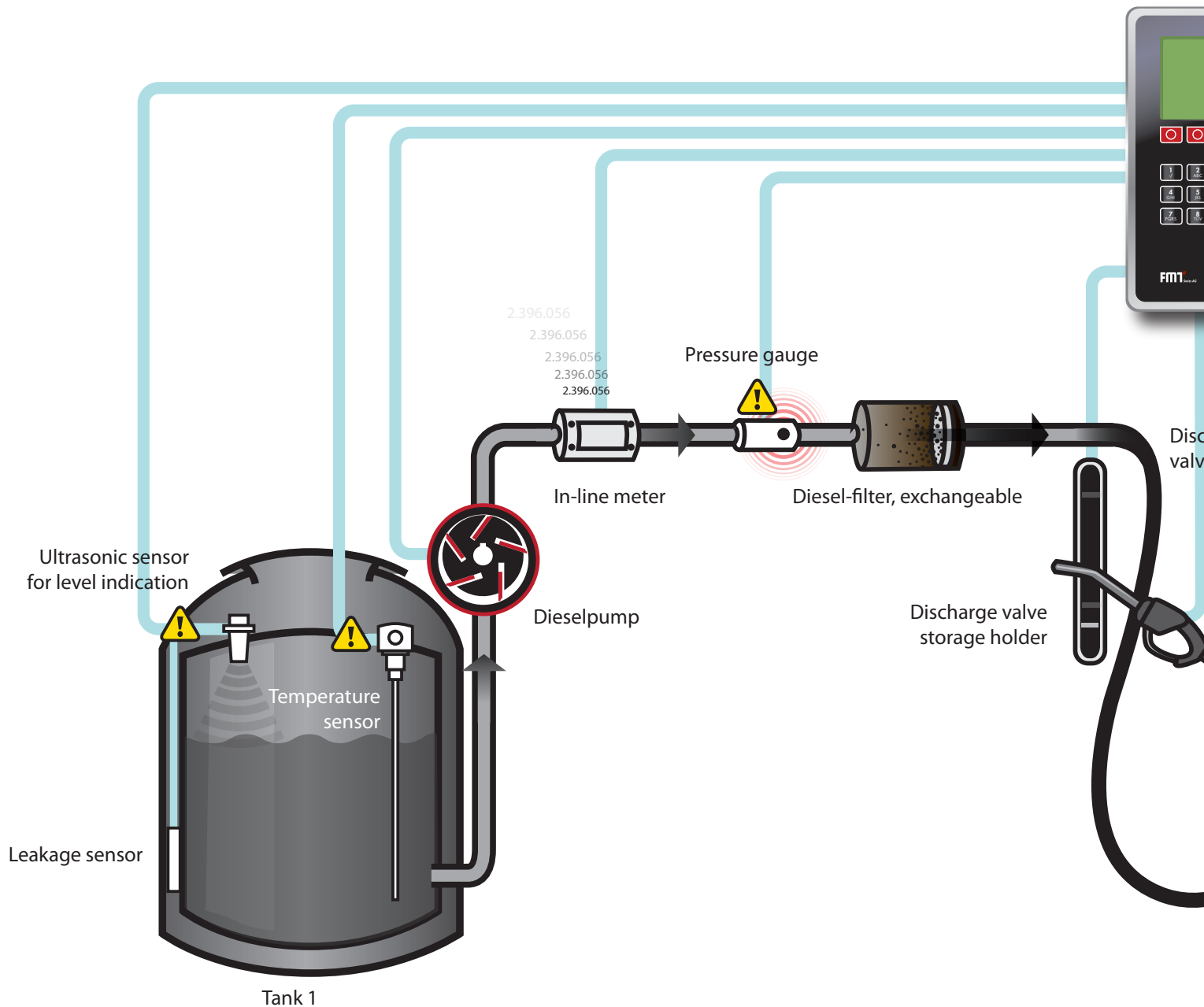
optional
optional
optional
optional

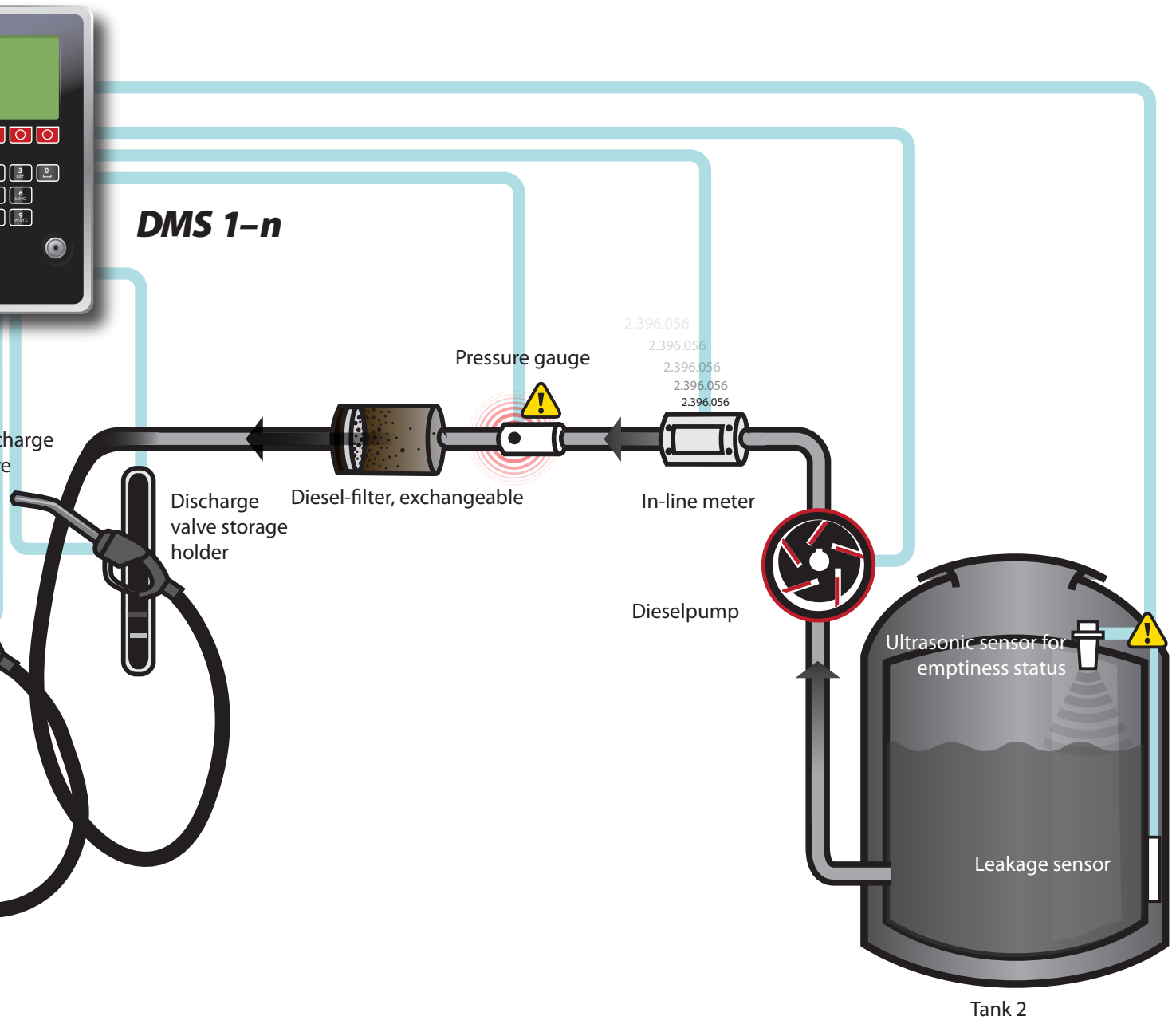
optional
optional
optional
optional
optional
optional
optional
optional

Reporting

- | | |
|------------------------|--------------------------------|
| → Choice 1 | specific time period |
| → Choice 2 | name of refuelling person |
| → Choice 3 | vehice license number |
| → Choice 4 | DMS 1 ... n |
| → Choice 5 | tank / refilling station |
| → Result indication 1 | date |
| → Result indication 2 | time |
| → Result indication 3 | DMS no. |
| → Result indication 4 | tank |
| → Result indication 5 | description of Tank (optional) |
| → Result indication 6 | fuel type (optional) |
| → Result indication 7 | mileage (optional) |
| → Result indication 8 | operating hours (optional) |
| → Result indication 9 | name |
| → Result indication 10 | vehicle license number |
| → Result indication 11 | vehicle description (optional) |
| → Result indication 12 | litres |
| → Result indication 13 | fuel price (optional) |

8. General survey DMS DieselManagementSystem







Service Manual DMS

DieselManagementSystem

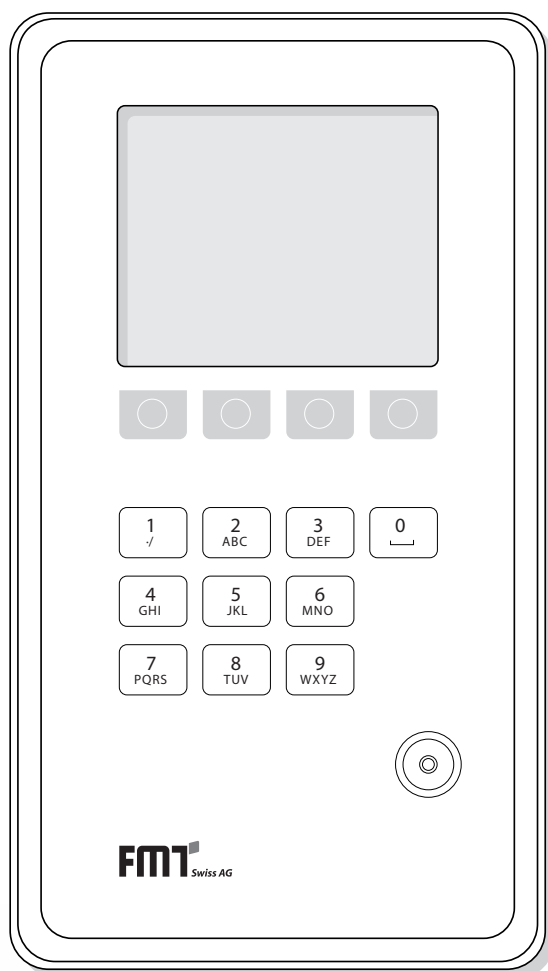


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1. Document history

Date	Name	Version	Change
28/10/2008	Ts	1.00	Initial draft
17/11/2008	Ts	1.01	Changes after new FW version
09/12/2008	Ts	1.02	Corrections
07/12/2009	HD	1.03	new configuration elements for heater limits input of operating hours
16/03/2010	HD	1.04	small revision

2. Configuration

The configuration will be updated every time the SD card is inserted to the control unit.

3. Identification

The identification of the user will be executed with a PIN, the iButton or both. Determine by setup. The PIN is a 4 digit number. The iButton ID is a 16 digit hexadecimal number and is marked on the bottom of the key.

Depending on the user type, the user has different rights of access. A "standard" user can fill his vehicle, the supervisor can set date and time and can calibrate the control unit. The service engineer can arrange hardware tests like a display test, verifying of the inputs and outputs and can update the system. The user type is will have be to configured by the DMS PC application for every user.

4. Vehicle selection

The vehicle selection can be effected either by a list of all assigned vehicles or with the manual input of the vehicle license number. If the selection is completed with the manual input of the license number, it will not be compared to the user's vehicle assignment.

5. Mileage / diesel consumption control

If the mileage is configured, the user has to enter the current mileage ahead of any refuelling process. With this input, the PC application is able to calculate an average diesel-consumption (per km) for the vehicle.

6. Operating Hours / gasoline consumption control

If operating hours input is configured (alternatively or additionally to the mileage), the user has to enter the current reading of operating hours. With this input the PC application is able to calculate an average diesel-consumption (per operating hour) for the vehicle.

7. Refuelling

After removing the diesel control nozzle, the pump will start with a certain delay set up in the PC application. This will prevent an overpressure, until the nozzle is placed in the vehicle tank.

During the filling, the amount of diesel discharged is shown at the display.

- The pump stops automatically when meeting one of the following conditions:
- Tank level below minimum
- Leakage failure (Leakage detected or no communication to TankAlert sensor)
- The user is not identified
- Maximum amount for filling is reached (selectable on PC-Application)
- The flow control does not determine a definite diesel flow for the specified time.
- The nozzle is placed back.

When the refuelling is completed and the nozzle is placed back correctly, all data are stored on the SD.

8. Supervisor

8.1 Date

On this display the date can be set. Pushing the left and right arrow it is possible to switch between the day, the month and the year. To confirm the new date, press the RETURN button.

8.2 Time

On this display the time can be set. Pushing the left and right arrow it is possible to switch between hours, minutes and seconds. To confirm the new time, press the RETURN button.

8.3 Calibration

The selected refuelling tap connection can be calibrated on this display. Remove the diesel control nozzle and start filling a calibrated vessel. The amounts of flow rate counter pulses are shown on the display. After the vessel is filled, place back the control nozzle and enter the volume of the vessel. A pressing of the RETURN button will save the calibrated volume. If the control nozzle is not placed back correctly, and the RETURN button is pressed, the calibration will be aborted, also if no volume of the vessel is entered.

8.4 Calibration A

The selected pump can be calibrated in this display with entering the pulse amount and the volume of the vessel. To switch between the input fields, use the up/down cursor. Pressing RETURN will save the calibrated volume. Volumes of zero are not allowed, they will abort the calibration.

To copy a calibration from one control unit to another unit, copy the file "Calib.dat" from the SD-Card and place it on the SD-Card of the new control unit.

9. Service

9.1 FW Update

This option is available, if a new firmware file exists on the SD card, only.

To make a firmware update the firmware file "DMS.bin" must be placed in the DMSdata folder of the PC application. Start an "export" of the data to the SD card. The "DMS.bin" is copied to the SD card. Now insert the SD card and login as a "Service engineer" user at the control unit. The menu item firmware update is now available. Select the menu item by pressing the 1.

To update the control unit, the RETURN key must be pressed in the updated display.

The control unit makes a restart and loads the new firmware. After the restart, you should see the new version on the top right side.

9.2 Inputs

This display shows all inputs of the control unit and their status, independent whether they are connected or not. If the input shows two columns, the first one shows the raw data read from the analogue input or the serial port. The second column shows the converted value.

For the leakage of tank 1, the first value shows the input of the sensor connected to X13/9 (Digital Input), the second value is delivered from the TankAlert.

With the "up" or "down" button switch to the next / previous page.

9.3 Outputs

This display shows all outputs from the control unit and their status.

With the "up" or "down" key, it is possible to mark an output. This output can be set with the "1" key or can be reset with the "0" key.

9.4 Display Test

The display test will write the characters, fed in on the keyboard, to the display. It can be stopped by pressing RETURN.

10. SD-Card

The SD-Card is the storage place of all data for the control unit.

All refuelling process data and the filling level are written and stored there. The configuration, provided users and the text shown is read from it. So the SD-Card is designed to be used as the transport medium for the data between the control unit and the PC application.

10.1 Files on SD-Card

The following files are on the SD-Card.

Name	Creator	Description
Text.txt	PC application	Language text file
Config.dat	PC application	Configuration file
User.dat	PC application	User file
DMS.bin	PC application	FW update file
Tank1.dat	PC application	File for Tank Level calculation
StationId.dat	PC application	Control unit / station ID file
Font.dat	PC application	Font file for control unit
Fuelling.dat	Control unit	File with filling process data
Tank.dat	Control unit	Fill level amount file
Calib.dat	Control unit	Calibration value file

10.2 Data from PC application

With the export function on the PC application, all necessary files are copied from the PC application to the SD-Card. The control unit detects the new SD-Card and reads all new files and reconfigures the unit.

10.3 Data to PC application

With the import function on the PC application, all necessary file are copied from the SD-Card to the PC application. The file "Fuelling.dat" is deleted after it was read by the PC application.

11. Timeouts

Name / Description	Timeout
Pin Input	1 min
Vehicle selection	1 min
I-Button connect after Pin Input	1 min
Mileage input	1 min
Display Tank name. Max. time to wait until control nozzle will have to be removed.	1 min
Service acknowledgement time. Max. time until a service function is selected	1 min
Supervisor acknowledgement time. Max time until a supervisor function is selected	1 min

12. Status LED / Error's

The Status LED is permanently active, if the system runs trouble-free. In case of an error the LED will blink. Each error is shown with its own amount of blink states. After each error, there is a delay of 2 sec.

Blinks	Description	Correction of the defects
1	SD Card missing	Insert SD card or remove and insert it again.
2	Configuration file error	The control unit cannot read the configuration file. Try to export data again from PC application.
3	Language text file error	The language text file cannot be read. Try to export data again from PC application.
4	User file error	The user tried to access to the control unit was unknown or the user file was missing.
5	Tank process file error	The process data file could not be written. SD not inserted or SD card is full.
6	Calibration error	The control unit is not calibrated. The supervisor must calibrate the system.
7	Font file error	The font file cannot not be read. Try to export data again from PC application.
8	Tank level table file error	The file with the level indication cannot not be read. Check if the level indication for the tank exists on the PC application and try to export data again from PC application.
9	Tank level file error	The file for the tank level cannot not be written.
13	Tank 1 pressure / filter error	Check the filter.
14	Tank 1 minimum error	Check the tank level. Minimum is reached.
15	Tank 1 leakage error	The tank has a leakage. Suck out the liquid.
16	Tank 1 temperature error	The tank temperature exceeds the calibrated temperature. Check the reason for this error.
17	Tank 1 level sensor error	Check the cable to the level sensor (Alert Sensor). Check the mounting of the sensor.
18	Tank 1 Temperature cable failure	Check the cable to the tank temperature sensor
19	Tank 1 Pressure cable failure	Check the cable to the pressure sensor
21	Tank 2 pressure / filter error	Check the filter.
22	Tank 2 minimum error	Check the tank level. Minimum is reached.
23	Tank 2 leakage error	The tank has a leakage. Suck out the liquid.

13. Heater

The heater is optional. It is recommended, if the temperature can get very low. The display is specified for a temperature from -20°C to +70°C. If the temperature can get below this range, it is necessary to place the heater unit.

The heater is switched on if the temperature falls below a configurable limit [°C] (Switch on Limit). If the inside temperature of the tank reaches a second limit, caused by the heating, the heater switched off again automatically (Switch off Limit). Both limits should be set appr. 10°C apart from each other to avoid a too frequent on-off switch of the heater.

Possible pre-set data: Switch-on limit 0°C, switch-off limit +10°C

If the heater unit is activated, it is self-controlling.

14. Battery

The battery is placed to store the date / time on the control unit, if external power-supply is lost.

The battery is designed for a lifetime of 5 years.

15. Fuses

The control unit is secured by 3 fuses.

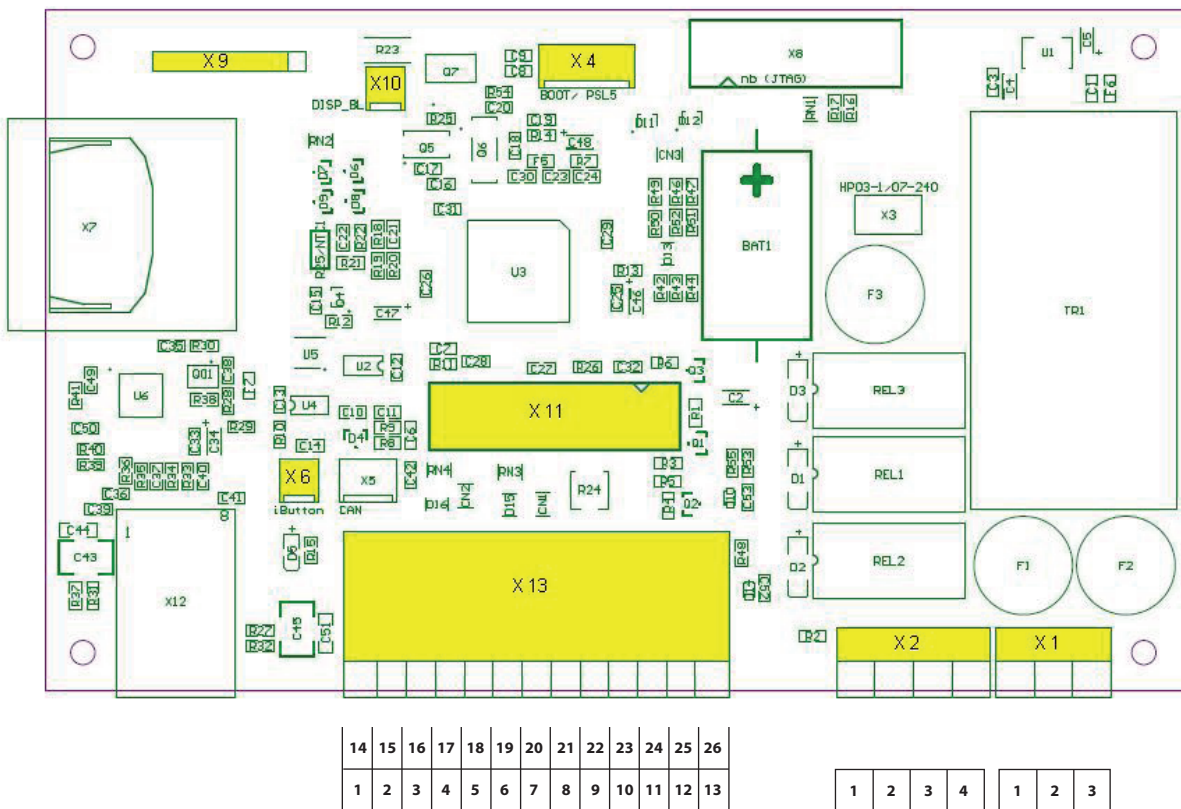
15.1 F1 / F2 Fuse power supply 230 V / 10 A

The fuses F1 and F2 secure the power supply and should be designed for 230 V~ and 10 A. With these fuses the pumps are protected.

15.2 F3 Fuse power supply control unit

The fuse F3 secures the power supply of the control unit and should be designed for 230 V~ and 1.5 A.

16. Connectors



16.1 Program download Connector, X4

Pin	Description
1	5 V output
2	TxD
3	RxD
4	Reset
5	Ground

16.2 I-Button Connector, X6

Pin	Description
1	Signal
2	Ground

16.3 Display Connector, X11

To adjust the contrast of the display, use the R24 potentiometer placed between the display connector X11 and the IO connector X13.

Pin	Description
1	FG
2	VSS
3	VCC
4	V adj
5	VEE
6	-WR
7	-RD
8	-CE
9	C/-D
10	-HALT
11	-RESET
12	D0
13	D1
14	D2
15	D3
16	D4
17	D5
18	D6
19	D7
20	NC

16.4 Display Backlight Connector, X10

Pin	Description
1	5 V
2	GND

16.5 Keyboard Connector, X9

Pin	Description
1	Ret 0
2	Ret 1
3	Ret 2
4	Ret 3
5	Scan 0
6	Scan 1
7	Scan 2

8	Scan 3
---	--------

16.6 Power Connector, X1

Pin	Description
1	N
2	PE
3	L

16.7 Heater Connector 250 VAC, X3

Pin	Description
1	L
2	N

16.8 Pump Connector 250 VAC / 10 A, X2

Pin	Description
1	L Pump 1
2	N Pump 1
3	L Pump 2
4	N Pump 2

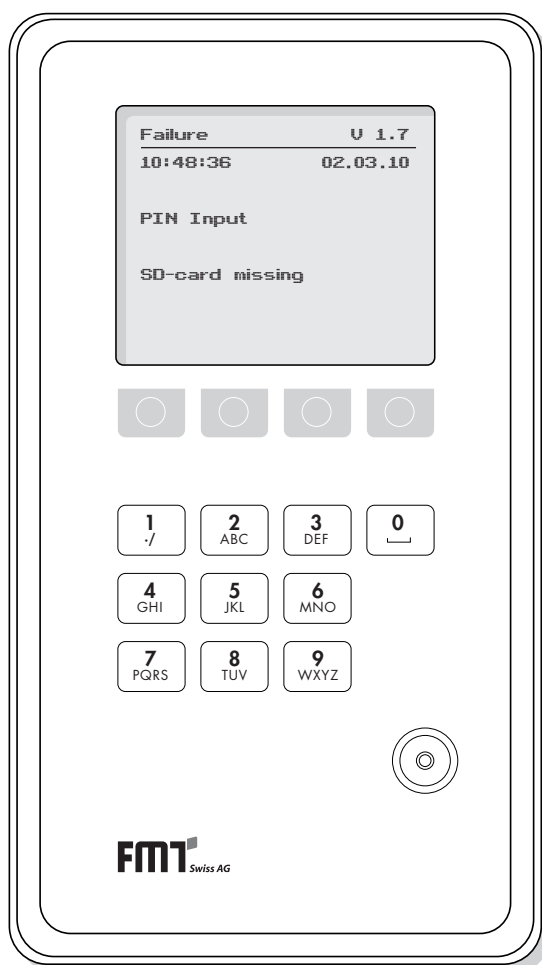
16.9 I/O Connector, X13

Pin	Description	Contact
1	Tank 1 control nozzle (Digital Input)	Normal Close
2	Ground	
3	Tank 1 flow control (Digital Input)	Don't care, pulse
4	Ground	
5	Tank 1 pressure (Analog Input, 4 – 20 mA)	
6	Ground	
7	Tank 1 Tank temperature (Analog Input, 4 – 20 mA)	
8	Ground	
9	Tank 1 Leakage (Digital Input)	Normal Open
10	Ground	
11	Tank 1 Level sensor (Serial Input)	Blue
12	Ground	Black
13	3,3 V / 5 V output supply	Red

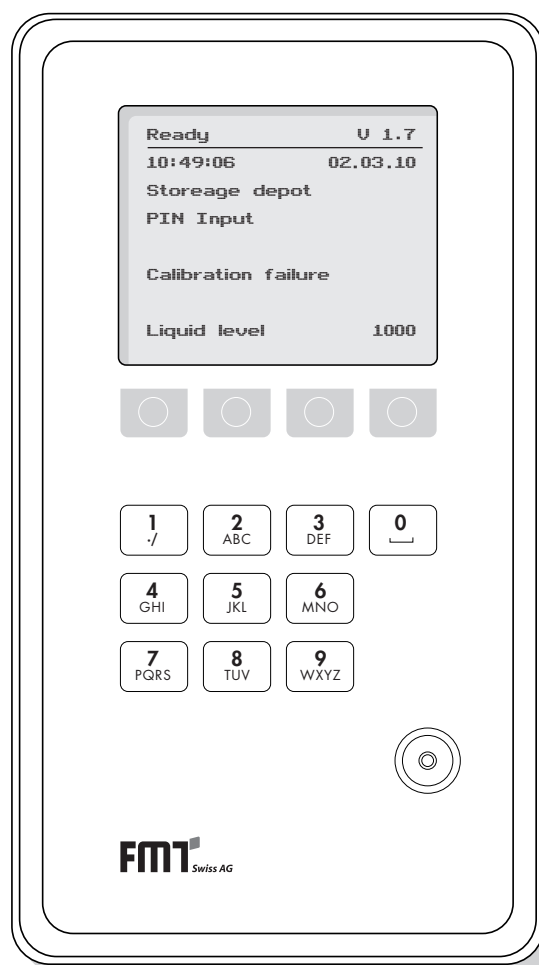
Pin	Description	Contact
14	Tank 2 gas nozzle (Digital Input)	Normal Close
15	Ground	
16	Tank 2 flow control (Digital Input)	Done care, pulse
17	Ground	
18	Tank 2 pressure threshold (Digital Input)	Normal Open
19	Ground	
20	Tank 2 Tank Minimum (Digital Input)	Normal Open
21	Ground	
22	Tank 2 Leakage (Digital Input)	Normal Open
23	Ground	
24	Reserve	
25	Ground	
26	Reserve	

17. Supervisor Menu

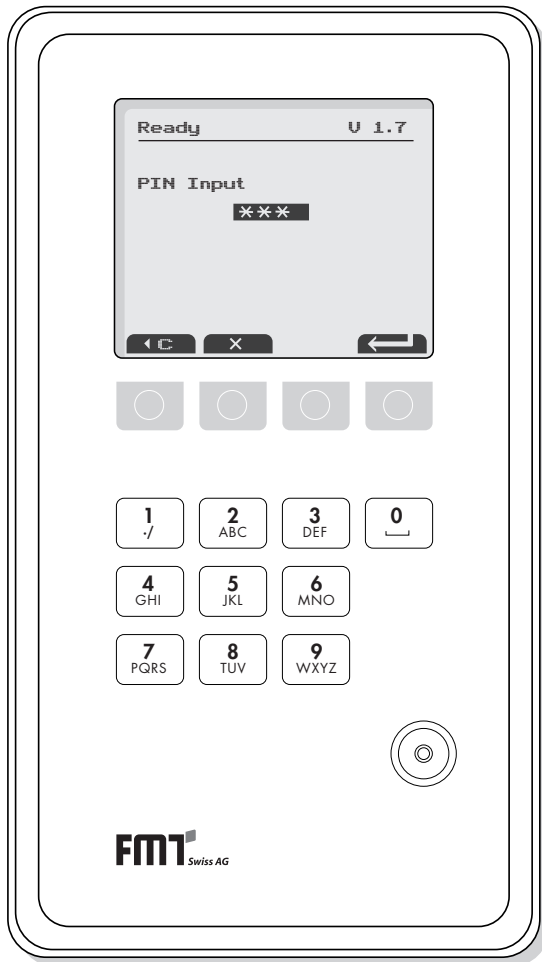
Start of installation



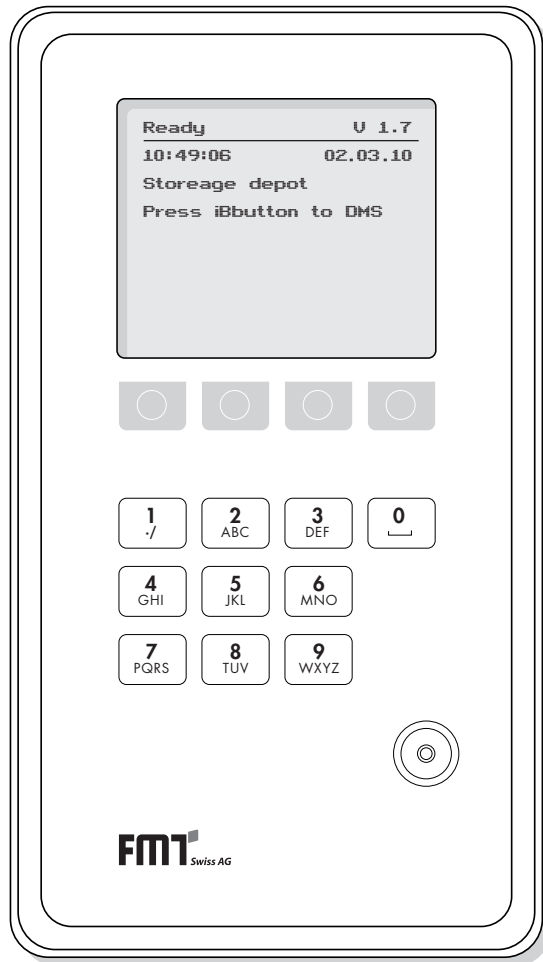
Insert SD-card into the DMS (PRESS any button for illumination.)



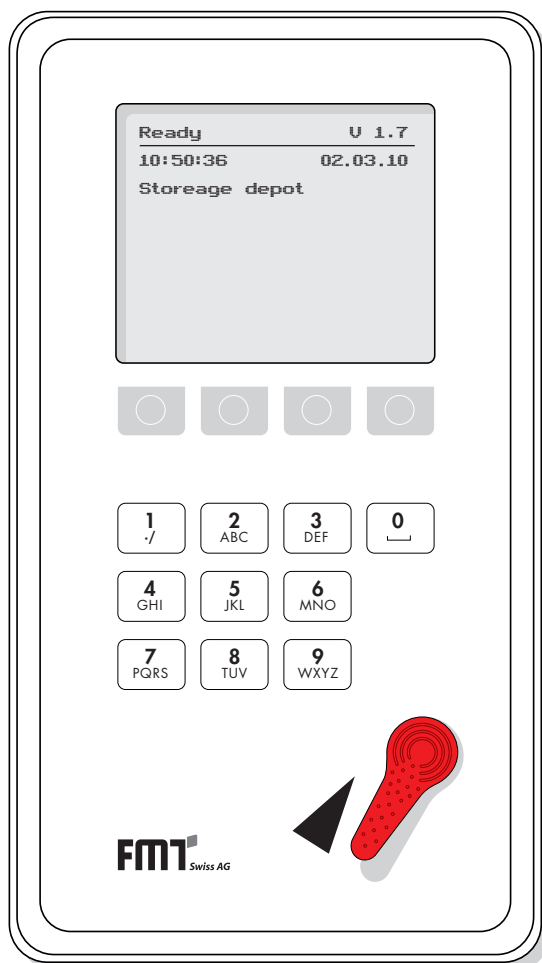
Request for PIN-input and calibration of the system (if not existing already)



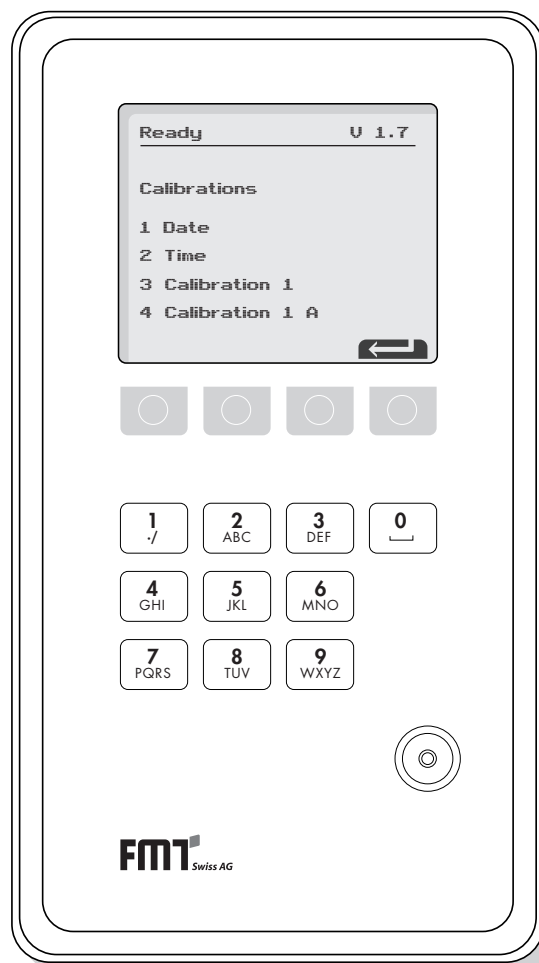
Enter 4-digits Supervisor PIN an press
Return-button



Request for i-button connection



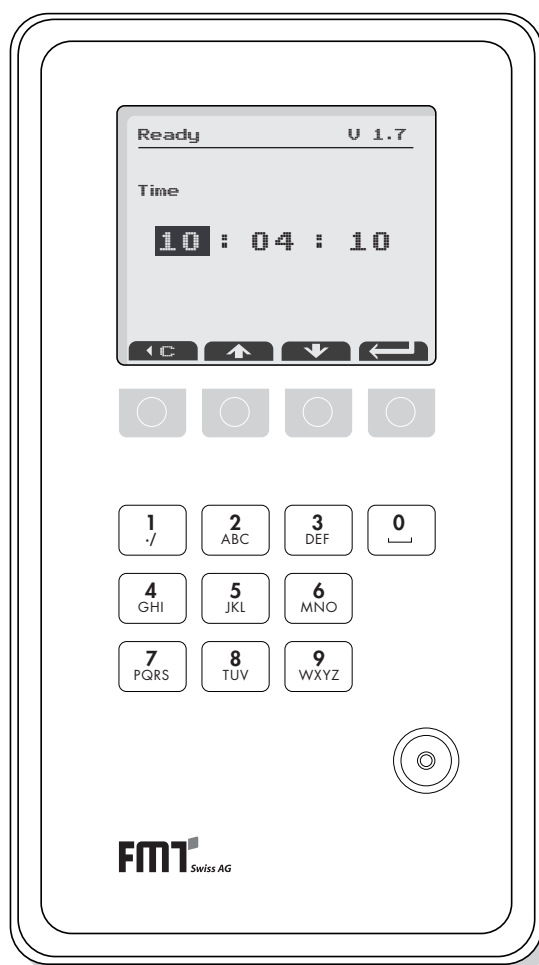
Connect red Supervisor i-button



The display shows any configurations to be done. Press buttons 1-4.



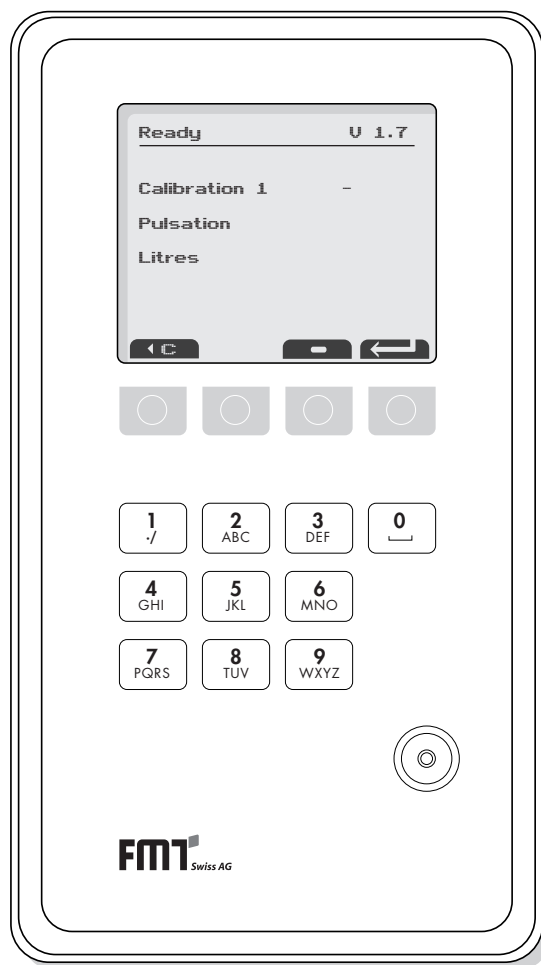
Enter date using the number keys. Confirm with the Return-button.



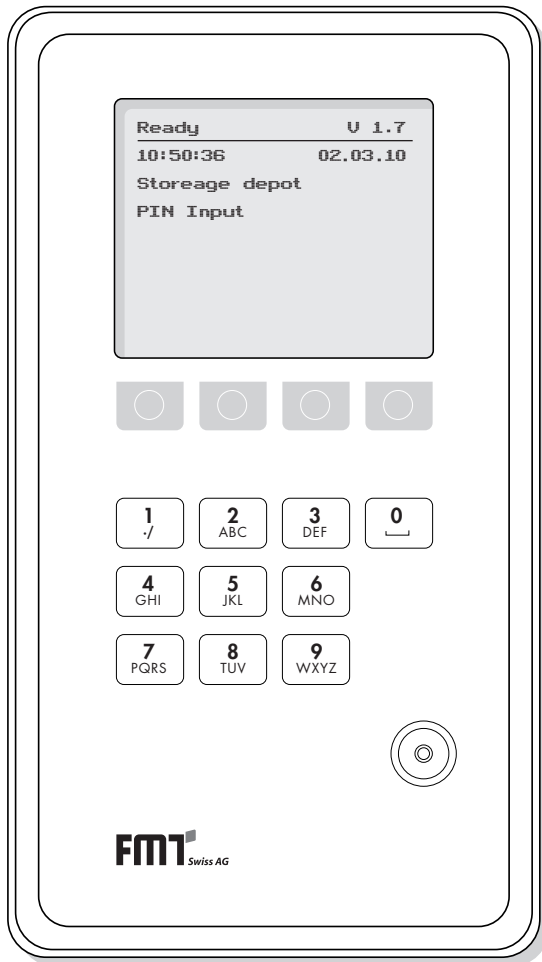
Enter time using the number keys. Confirm with the Return-button.



Calibration according to the demands



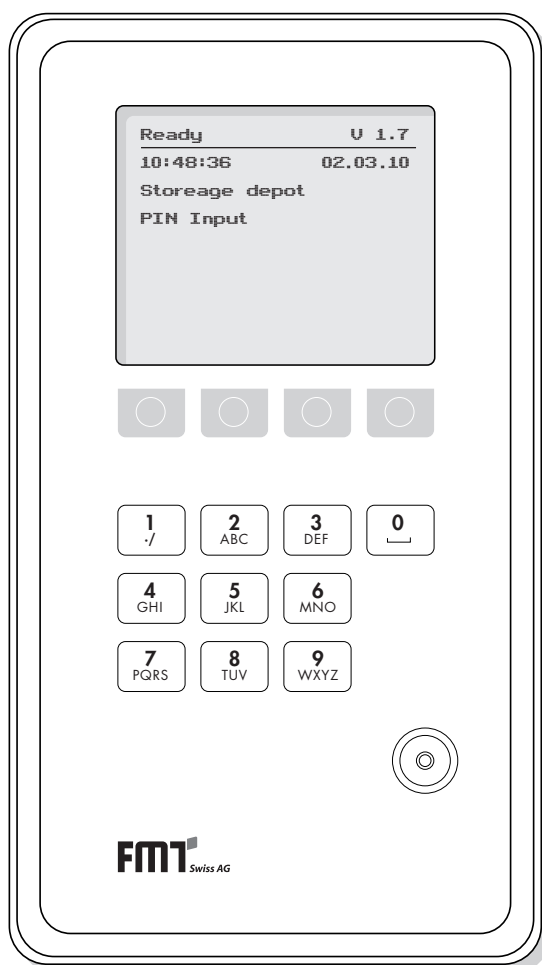
Confirm calibration by a refilling process (see page 4, 8.4). Confirm with Return-button.



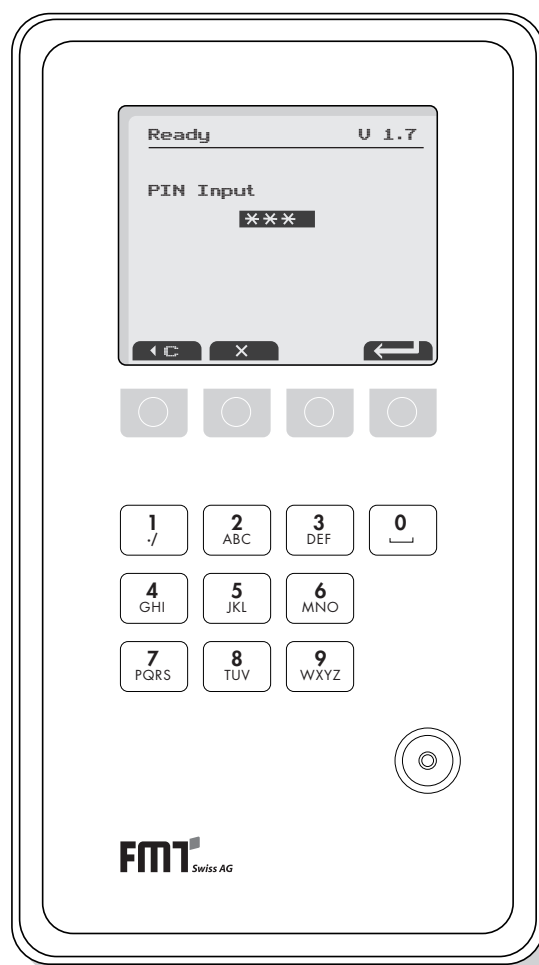
Back at start menu 1

18. Service Menu

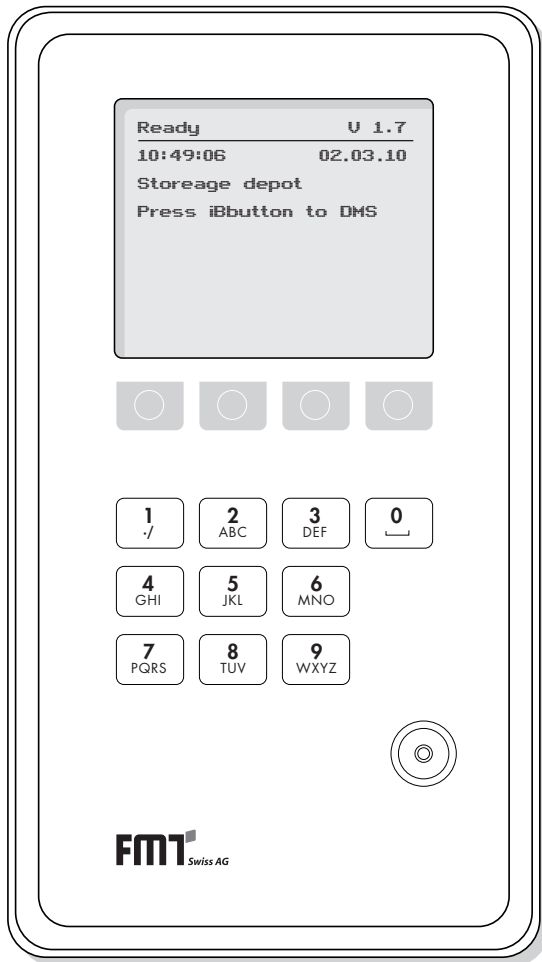
(Check-up of the system and of the emergency functions)



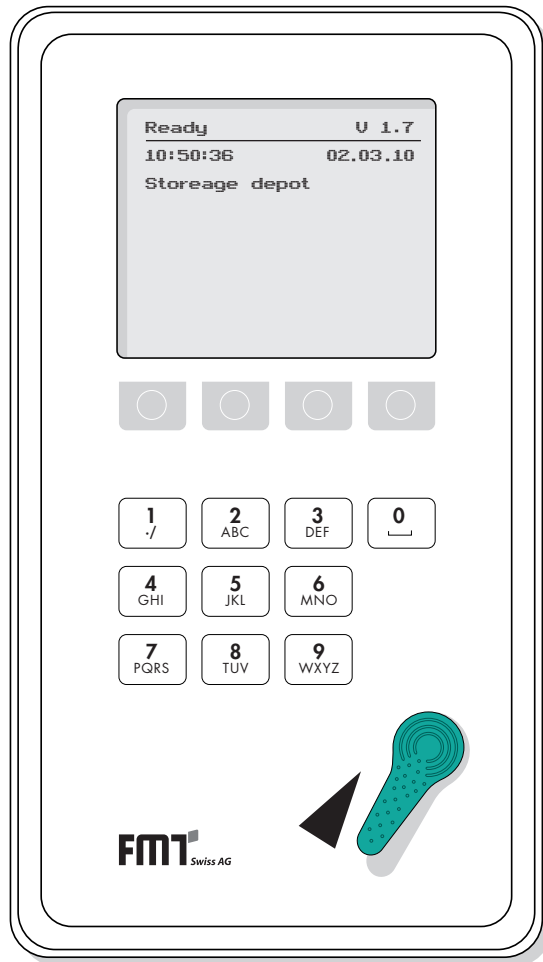
Request for PIN-input



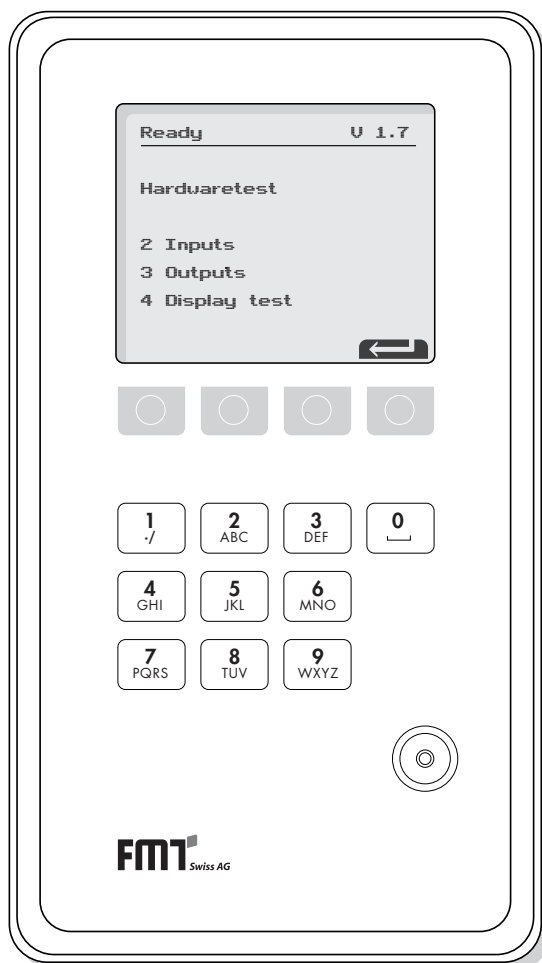
Enter 4-digits Service PIN an press Return-button



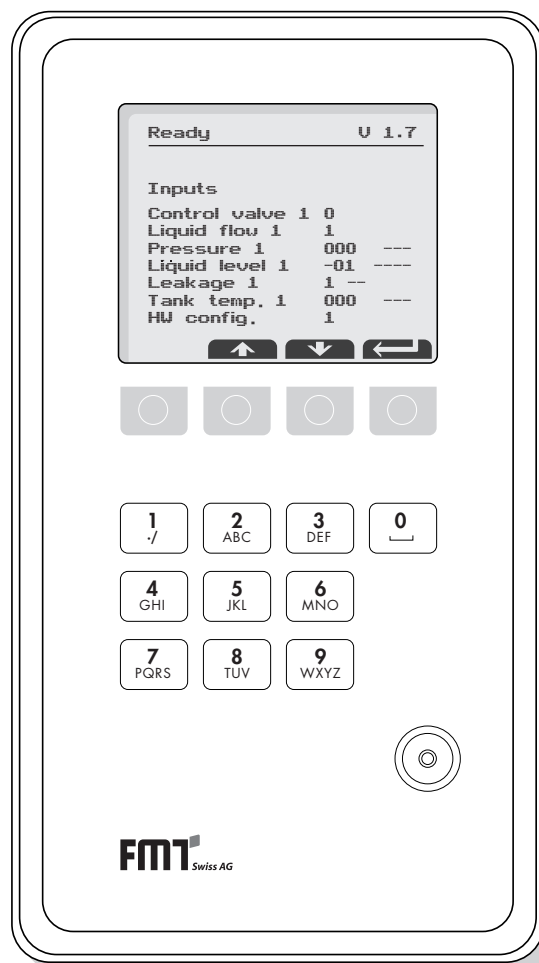
Request for i-button connection



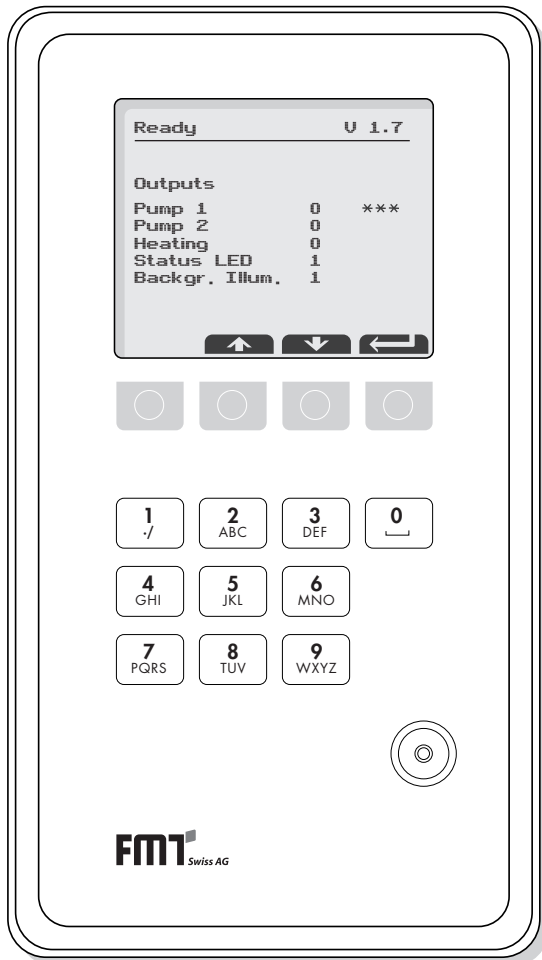
Connect green Service i-button



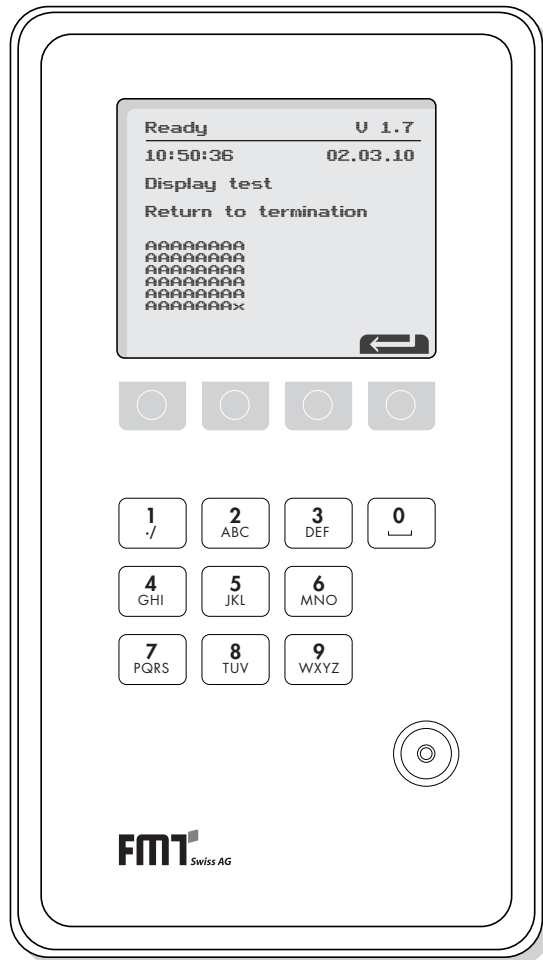
The display shows any configurations to be done. Press buttons 2-4.



Check inputs.
Operating the different components 1 or 0 will appear.

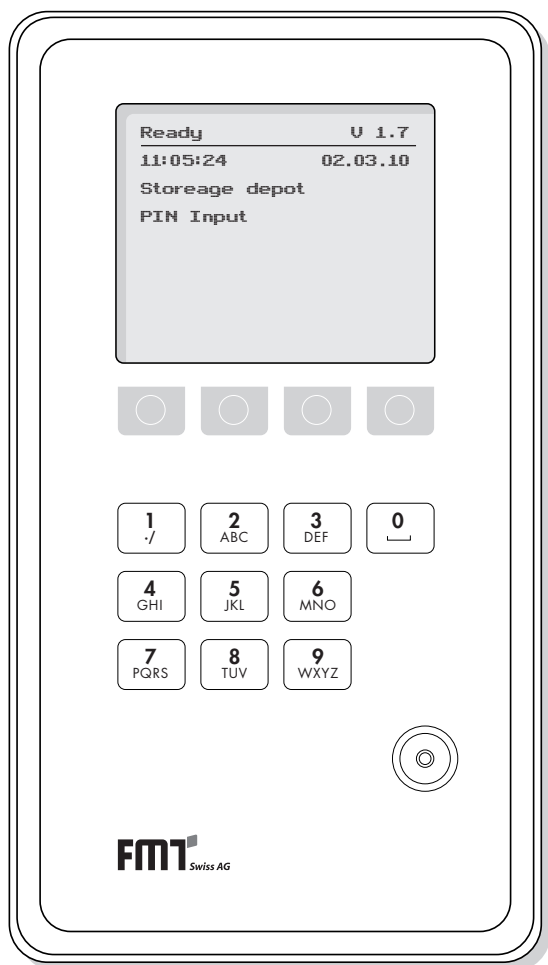


Check outputs.
The selected component will go on line, i.e. the pump shall start operating, if you set 1.

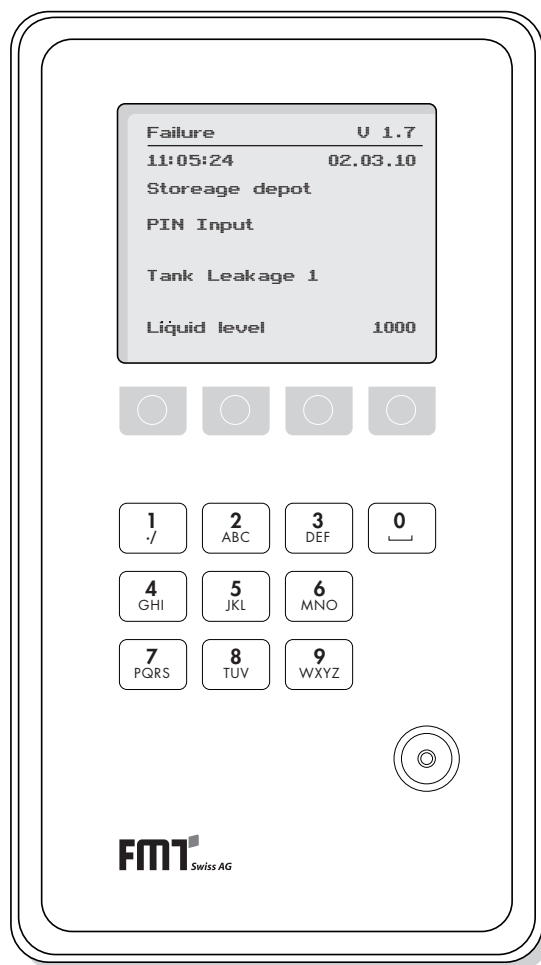


Check the complete display.
Go back to starting menu pressing the Return-button.

Emergency function to empty a leaking tank



Back at start menu 1



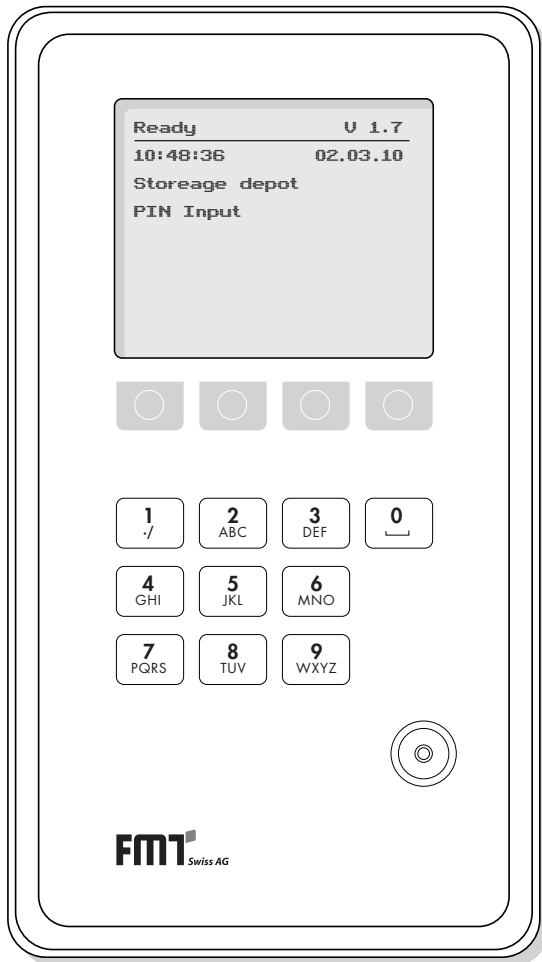
The display shows „Tank leakage“

(The complete tank installation is out of order.)

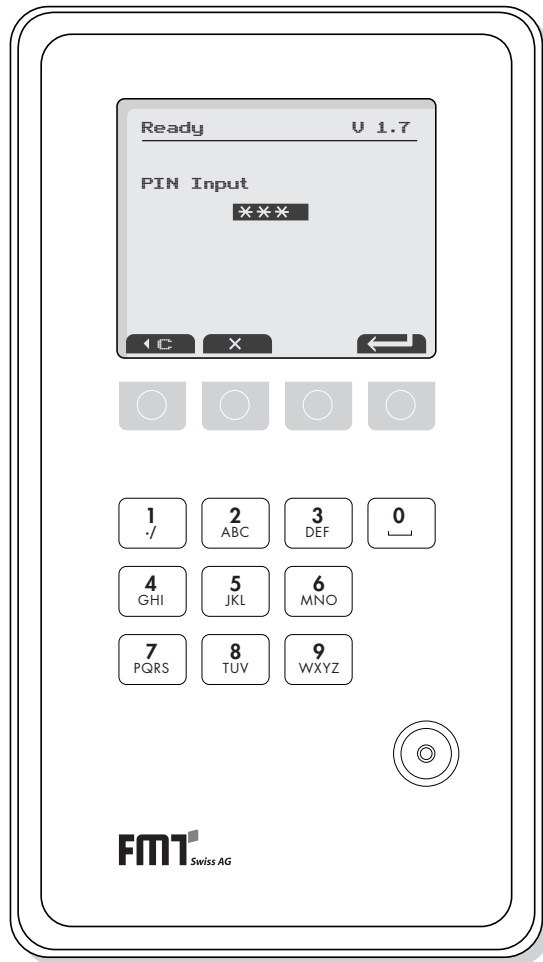
This situation occurs if a tank leaks. Noticing the leak the pre-set leakage sensor blocks the complete installation.

The leaking tank can be emptied by a manual switch on of the pump with the function “Check outputs” in the Service menu.

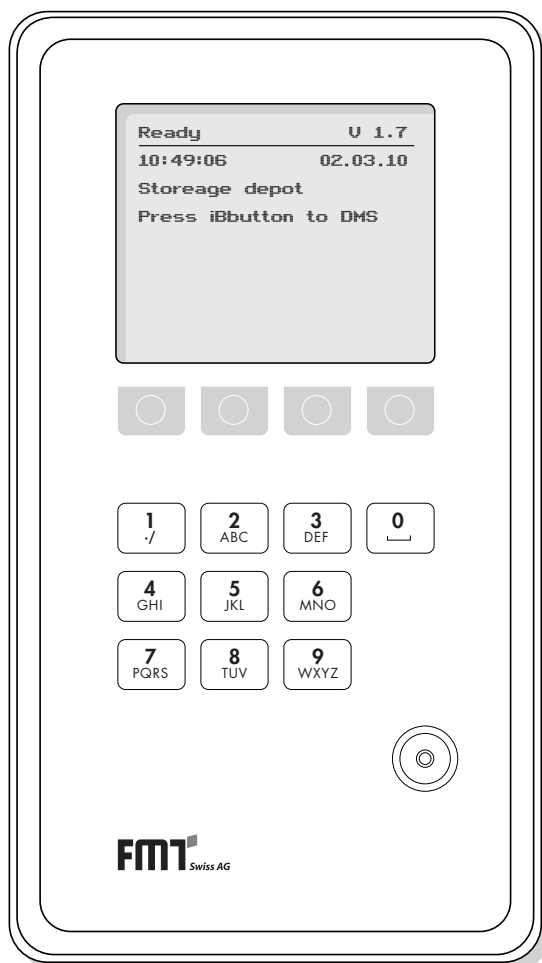
19. Operation of a refuelling process



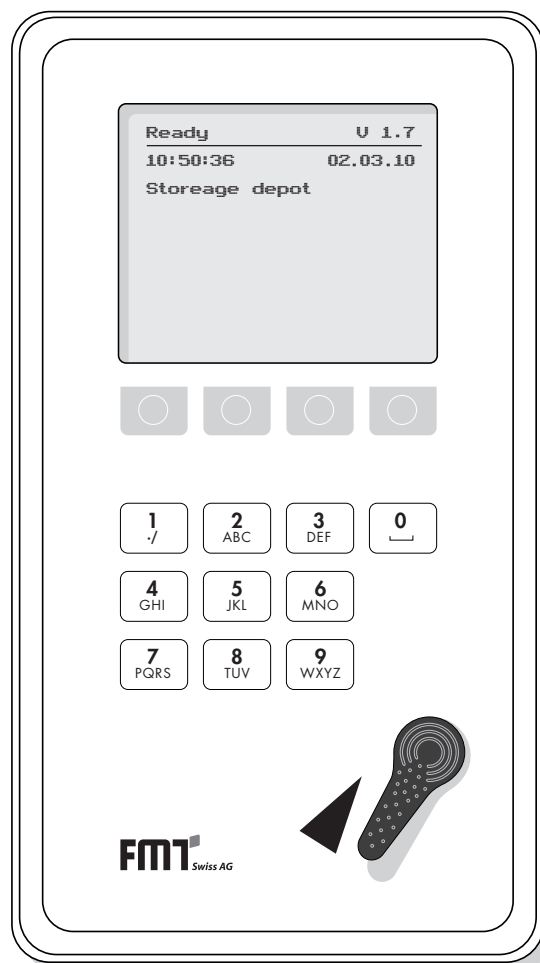
Request for PIN-input



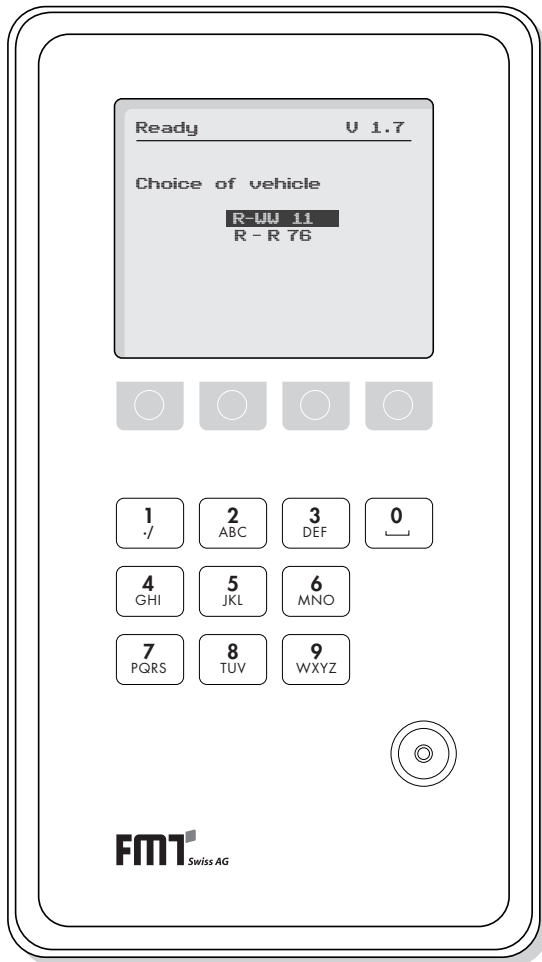
Enter 4-digits User PIN an press Return-button



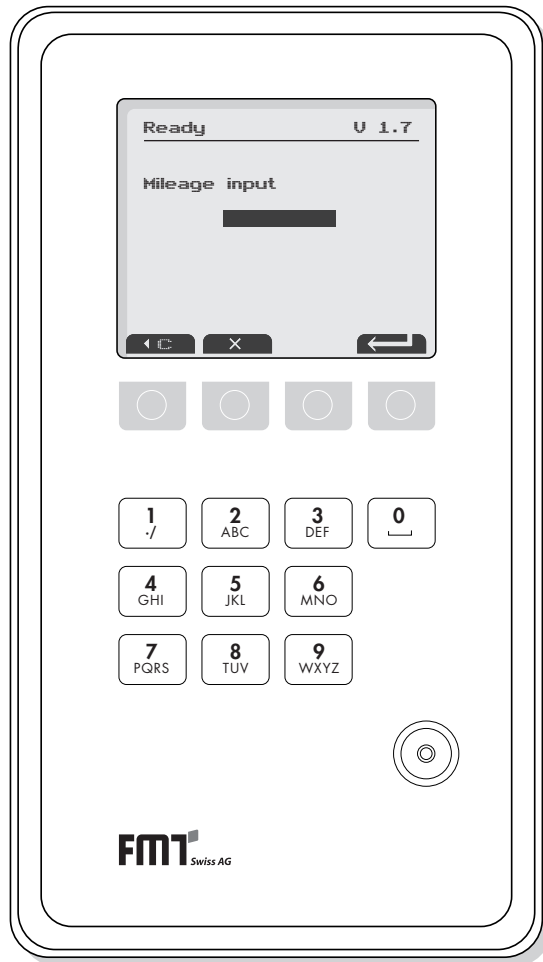
Request for iButton connection (in case i-button is pre-defined)



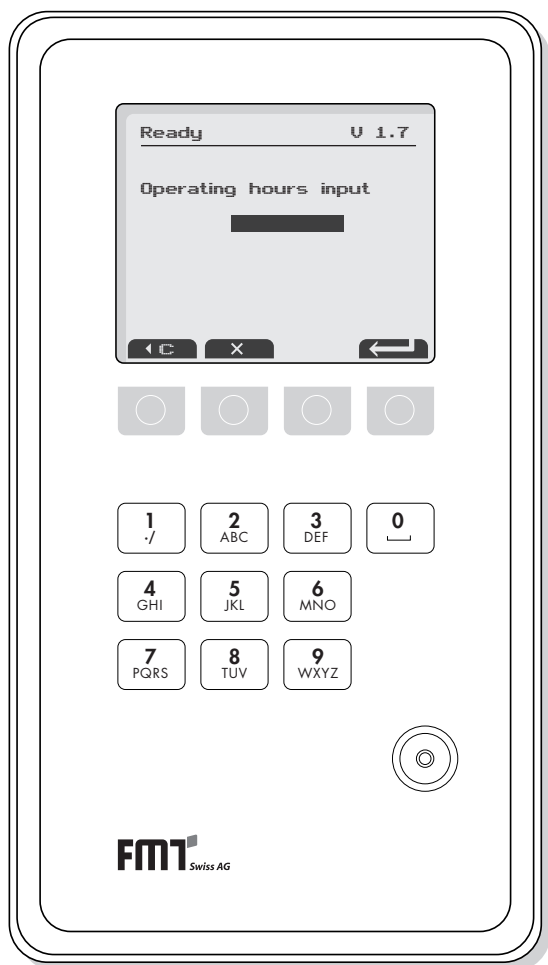
Connect black user iButton



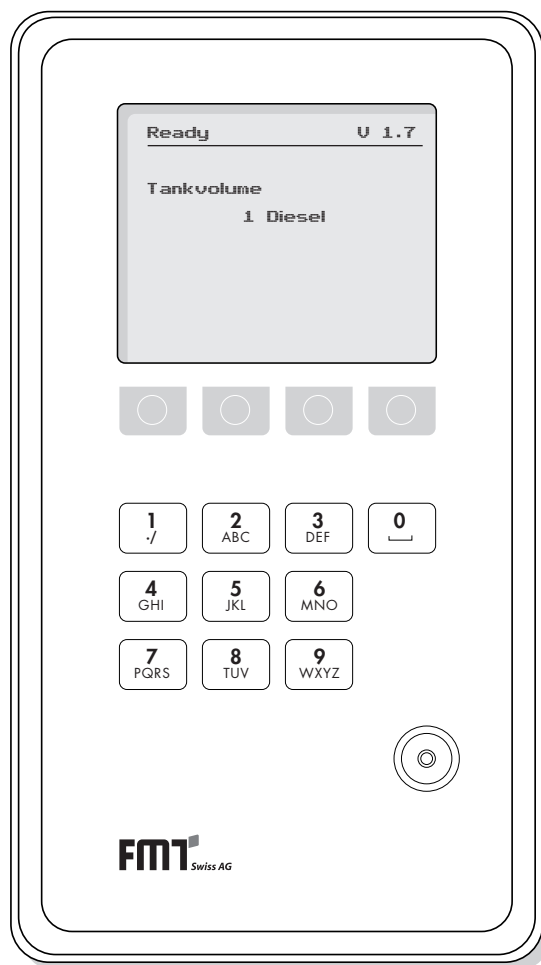
Select vehicle identification number (if not pre-defined).



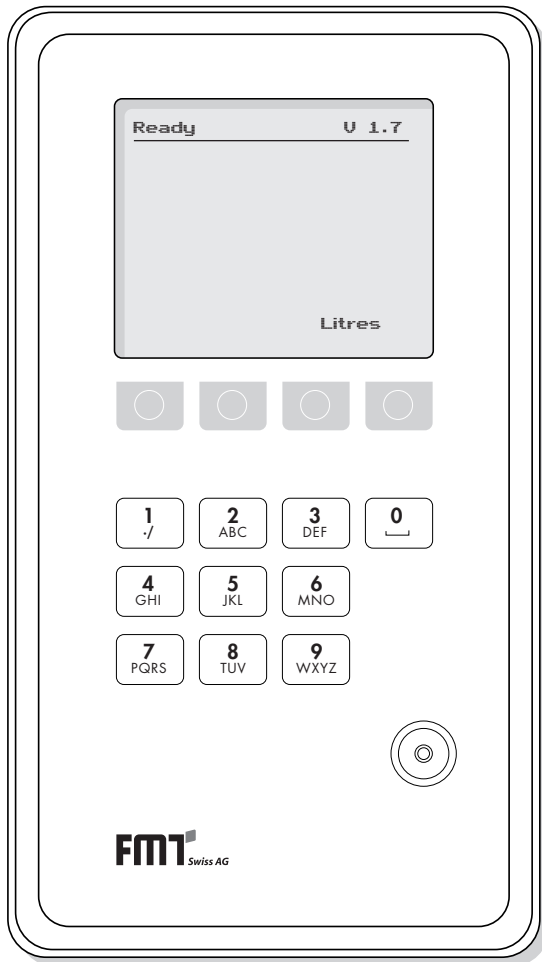
Enter mileage (if the input of the mileage is requested)



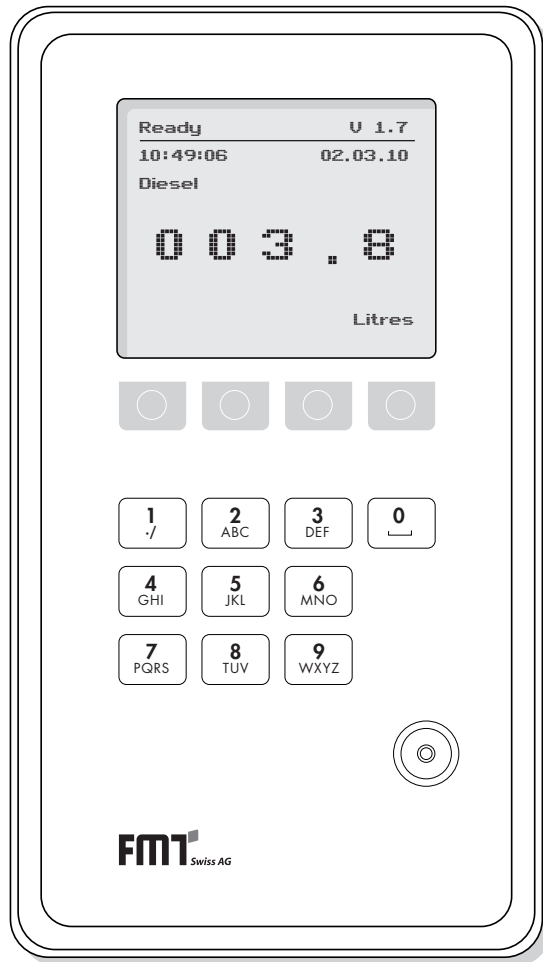
Enter operating hours (if the input of the operating hours is requested)



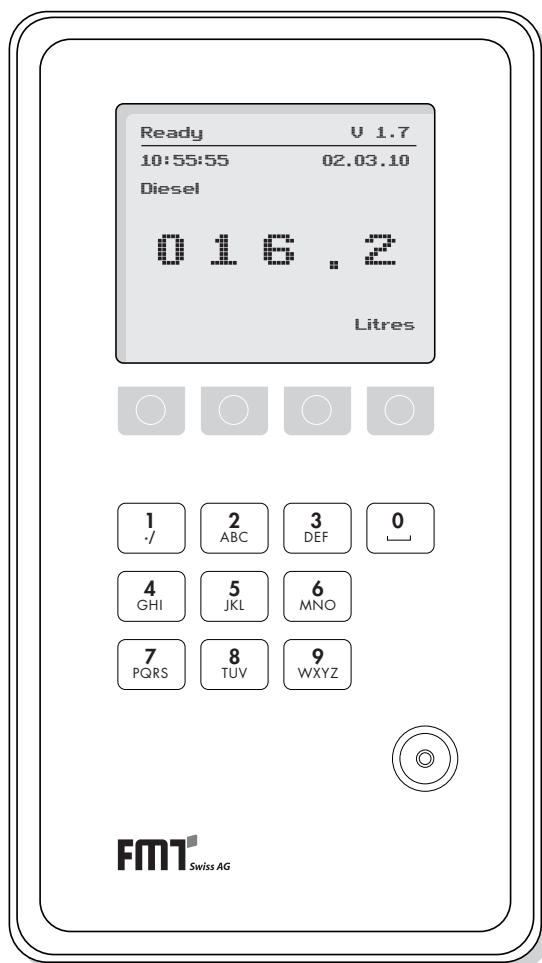
Tank level is displayed.



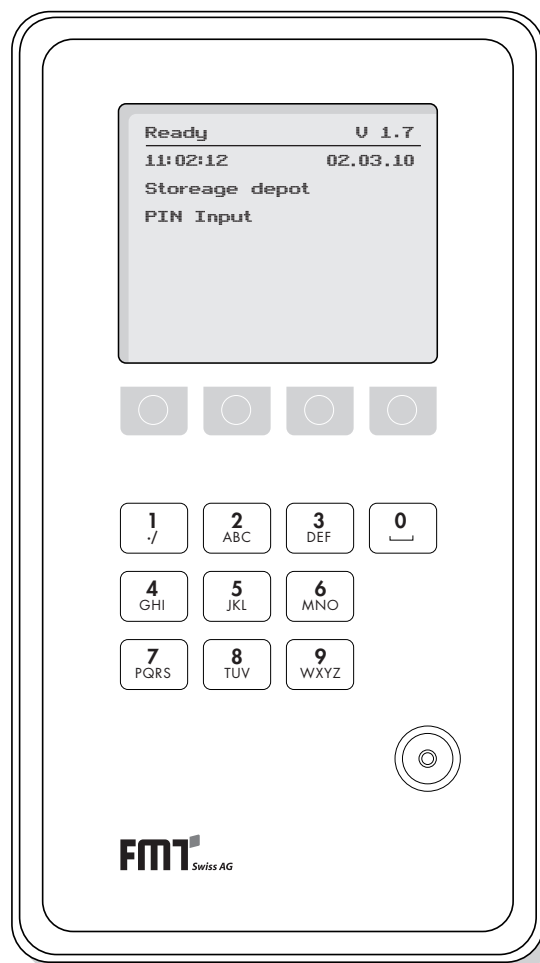
The display waits for the start of refuelling.



Refuelling in operation.



The total refuelled volume will be shown in litres after the refuelling process has been ended.



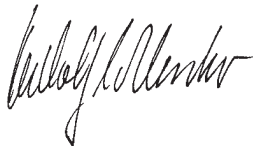
The display automatically sets back to starting menu according to the pre-set time of the system.

20. EC Declaration of Conformity

We hereby declare that the product described here, its concept and construction, including this particular model, complies with the EC requirements. Any change to the product, not approved by us, will invalidate the declaration.

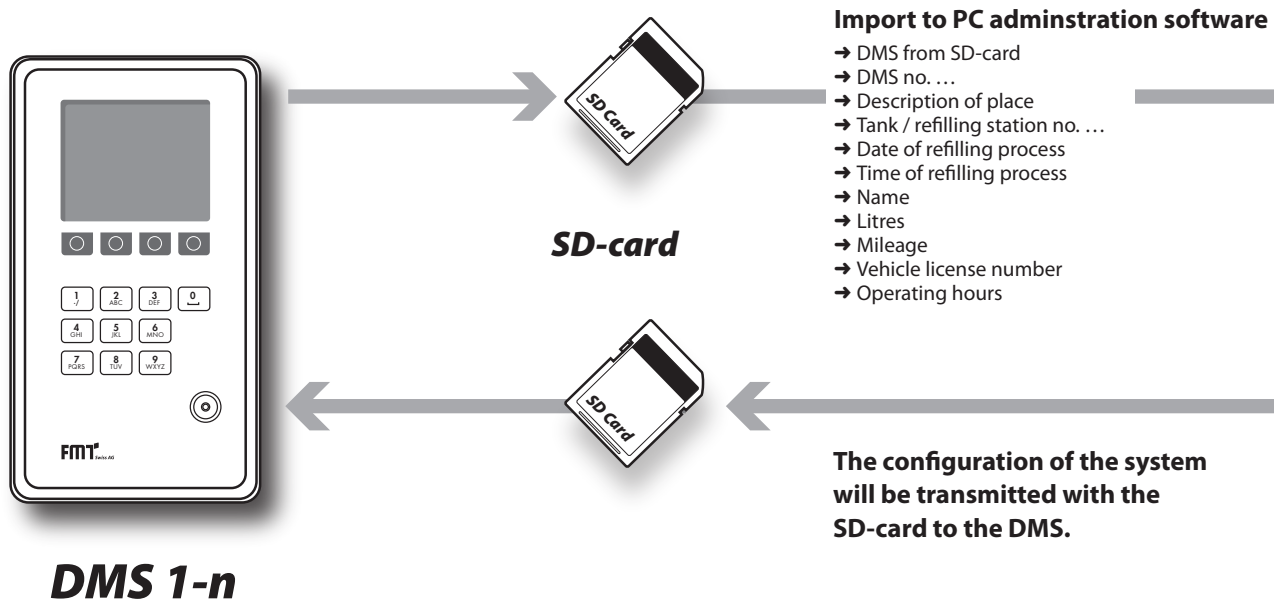
Product Description	DieselManagementSystem
Product Type	Control unit
Year of Manufacture	See Nameplate
Applicable EC-Directives	EC-Low Voltage Directives (73/23/EEC) EC-Directives Electro-magnetic Compatibility (89/336/EEC) - 93/31/EEC
Applicable National Standards	DIN VDE 0843 T1 (German)

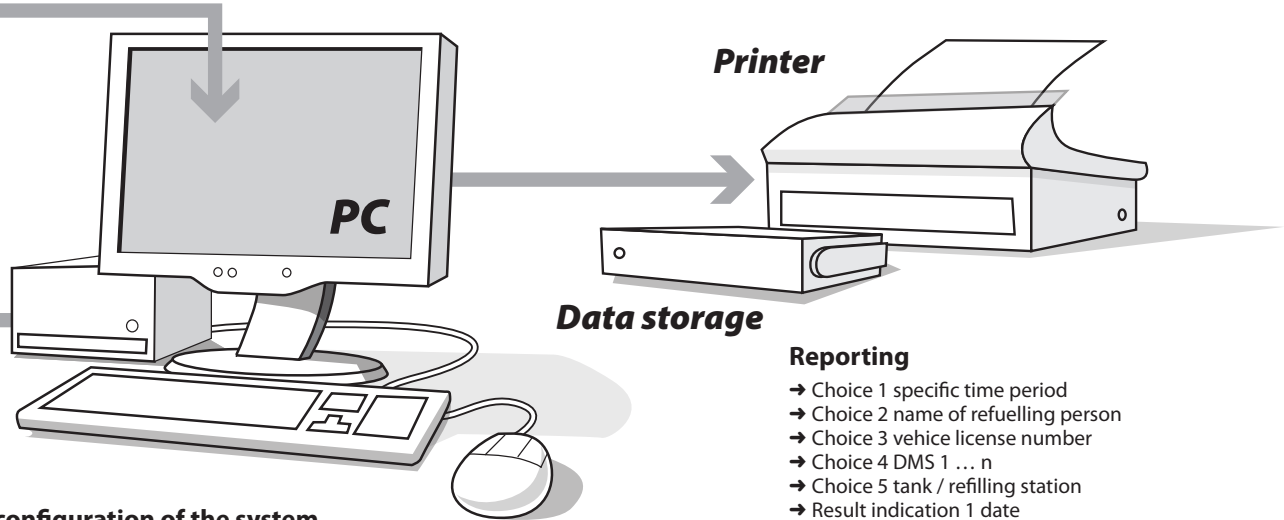
11.04.2011 FMT Swiss AG



Dipl.-Ing. Rudolf Schlenker

21. Data-flow DMS DieselManagementSystem





The configuration of the system will be generated on a PC and stored on the SD-card

- Names of users
- Configuration of i-button ident
- Assignment of the i-button ident to a user
- Number of permitted input failures (PIN)
- Time-out after permitted input failures (min)
- Time between refuelling and non-operative time (sec)
- Configuration of user pass-words
- Type of user, user oriented
- Classification of vehicles, user oriented
- Description of vehicles
- Classification of refilling station = tank, user oriented
- Description of refilling station = tank
- Minimum refilling level for empty tank 1
- Volume calibration = tank 1
- Volume adjustments
- Language
- Charakter set
- Mileage input yes/no, user oriented
- Input of operating hours yes/no user oriented
- Max. refuelling volume, all users
- Pressure = refilling station 1: yes/no
- Pressure = refilling station 1 = DMS 1: maximum pressure
- Pressure = refilling station 1 = DMS 1: minimum pressure
- Pressure = refilling station 1 = DMS 1: pressure threshold
- Liquid level tank 1: yes/no = DMS 1
- Integral leakage sensor: yes/no = DMS 1 = tank 1
- Leakage: yes/no = DMS 1 = tank 1
- Pressure = refilling station 2 = DMS 1: pressure threshold
- Tank empty = tank 2 = DMS 1
- Tank leakage = tank 2 = DMS 1
- Temperature of tank 1: yes/no = DMS 1
- Temperature of tank 1: min = DMS 1
- Temperature of tank 1: max = DMS 1
- Temperature of tank 1: threshold = DMS 1
- DMS heating switch-on at (°C)
- DMS heating switch-off at (°C)
- Background illumination (min)
- Time delay of pump operation (sec)
- Liquid-flow check time (sec)

metered

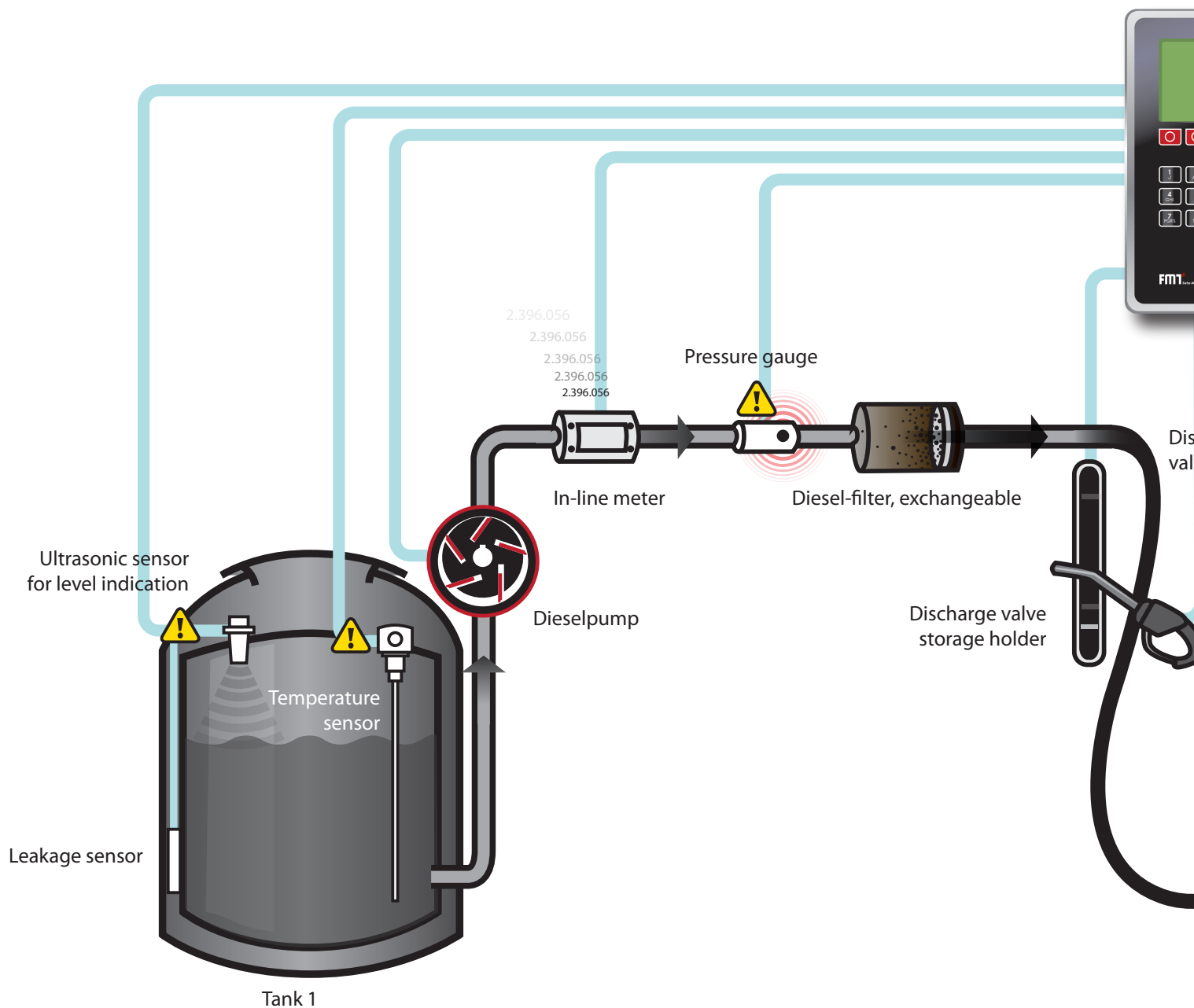
optional
optional
optional
optional

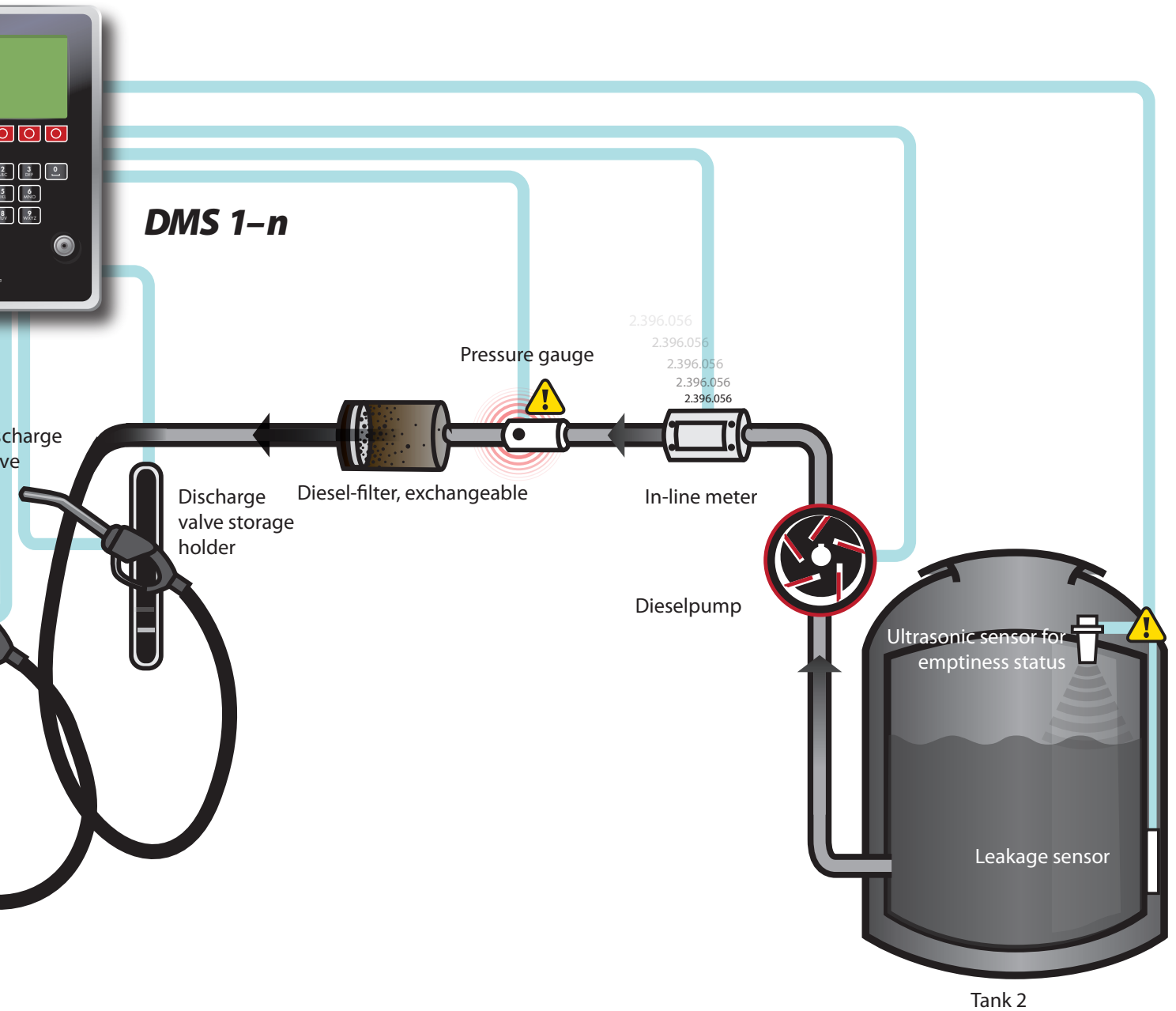
optional
optional
optional
optional
optional
optional
optional

Reporting

- Choice 1 specific time period
- Choice 2 name of refuelling person
- Choice 3 vehicle license number
- Choice 4 DMS 1 ... n
- Choice 5 tank / refilling station
- Result indication 1 date
- Result indication 2 time
- Result indication 3 name
- Result indication 4 vehicle license number
- Result indication 5 volume discharged
- Result indication 6 refilling station/tank
- Result indication 7 mileage
- Result indication 8 consumption / 100 km
- Result indication 9 operating hours
- Result indication 10 consumption l/h
- Result indication 11 remarks
- Result indication 12 description

22. General survey DMS DieselManagementSystem







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